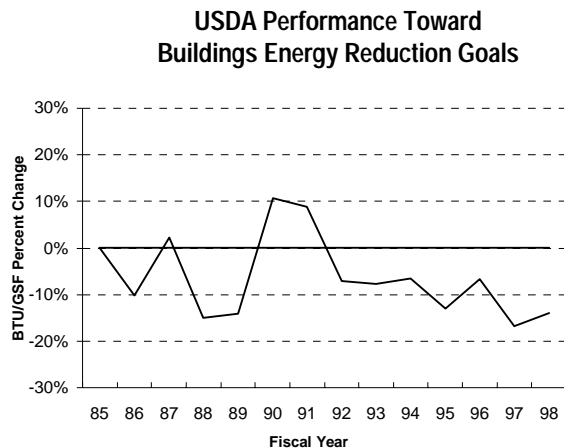


V. FEDERAL AGENCY ENERGY MANAGEMENT ACTIVITIES

1. DEPARTMENT OF AGRICULTURE (USDA)

Energy Efficiency Performance and Implementation Strategies

In FY1998, the United States Department of Agriculture reported a decrease of 14.0 percent in Btu per gross square foot compared to FY 1985.



USDA Buildings Energy Use and Costs, FY98

	BBtu	\$ (Thou.)
Electricity	1,172.0	23,040.6
Fuel Oil	63.5	468.6
Natural Gas	485.3	2,064.4
LPG/Propane	207.1	1,326.4
Coal	0.4	2.0
Purchased Steam	116.0	1,153.0
Other	66.7	1,757.0
Total	2,111.1	29,812.0

During FY 1998, USDA discovered a discrepancy in the methodology used in reporting square footage data for previous years. Square footage for buildings with fully-serviced leases had been erroneously included in USDA totals dating back to FY 1985. This is space for which USDA neither paid for, nor reported, energy consumption. Square footage data has been adjusted for all previous years to reflect the removal of fully-serviced leased space.

Following are details of individual USDA agencies' energy conservation improvements in FY 1998:

- The Office of Operations (OO) began work on the South Building Modernization Project, which will result in an energy showcase facility of approximately 2 million square feet. In FY 1998, OO expended approximately \$9 million for energy-efficient plumbing, electrical and HVAC systems.
- The Office of Operations, Washington Area Service Center funded energy improvements in the estimated amount of \$30,000 in FY 1998, including retrofitting lights, repairing steam systems, installing light sensors, and upgrading insulation.
- The Agricultural Research Service (ARS) has developed a 10-year energy retrofit plan. In 1998, energy audits were performed at ARS locations in Houston, Texas; College Station, Texas; and Albany, California. In FY 1998, it is estimated ARS accomplished more than \$1.9 million worth of building energy conservation and efficiency improvement projects throughout the nation.
- The Forest Service (FS) completed over 50 audits and is implementing projects as funds are available. Energy conservation work totaling at least \$190,000 was performed across Regions 2, 3, and 10, and the North East Station, along with an ESPC delivery order in the Pacific North West Region at Corvallis, Oregon. Also, an energy-efficient ground-coupled heat pump system was installed at the Oconee RD Office in Oconee National Forest, Georgia. A similar system has been designed for the Choctaw RD Office in Ouachita National Forest, Oklahoma.
- FS is developing plans to significantly increase its use of cost-effective solar and other renewable sources. During FY 1998, FS implemented over \$190,000 worth of renewable energy projects throughout Region 3.

Energy Showcase Facilities

ARS has named the Horticultural Research Laboratory in Fort Pierce, Florida, and the San Joaquin Valley Agricultural Center in Parlier, California as new building showcases. Highlighted technologies include:

- Energy-wise exterior skin (the combination of vertical and horizontal fins);
- Building automation systems;
- Occupancy sensors in offices;
- Variable volume ventilation systems in laboratories, energy-efficient chillers, variable-speed pumps, and high efficiency boilers; and
- Energy-efficient lighting.

OO's Beltsville Office Facility won an award as a new construction energy showcase facility for four buildings. Technologies included will be passive solar features, low-E windows, building overhangs, photo sensors, and shading using the existing landscape.

Training

The ARS Beltsville Area Research Center has an increasingly active energy management group. FS often includes energy management issues and short training sessions during the FS National Facilities Workshops and regional meetings. During the November 1998 national workshop in Tucson, Arizona, representatives from two DOE Regional Offices and Johnson Controls opened discussion of ESPC possibilities.

Funding

Within USDA agencies, funding for energy and water efficiency improvements in buildings are not kept by line item. Energy efficiency improvements are incorporated into all new construction, remodeling, and many maintenance projects.

Energy Savings Performance Contracts

Two Super ESPC delivery orders are in the process of being awarded for ARS:

- The National Agricultural Library (NAL) in Beltsville, Maryland was selected by DOE as a pilot site for the Mid-Atlantic Regional Super ESPCs. The Regional award was made in March 1999 and the delivery order will follow. Energy improvements at the NAL will include upgrades of the lighting and HVAC systems, and the upgrading or replacement of water chillers.
- The National Animal Disease Center (NADC) in Ames, Iowa was selected as a pilot site for the Midwest Regional Super ESPC. The delivery order

is currently being prepared. Proposed energy improvements include the upgrade of lighting and HVAC systems, and the upgrading or replacement of water chillers.

ARS also examined executing an ESPC at Plum Island, New York, for chilled water loops, lighting, wind power generation, and variable frequency drives. This project was discontinued due to projected environmental impacts on the bird population.

FS signed an ESPC delivery order with Honeywell, Inc., in September 1998 for the Corvallis, Oregon Laboratory. Installation of energy conservation measures including lighting retrofits, an energy management and control system, outside air reduction and steam trap modifications has begun, with final inspection scheduled for June 1999. The contract term is 11 years and will result in projected energy savings of \$775,000 and an operational savings of \$180,000. Total capital improvement to the facility is \$448,000. Total annual savings amount to approximately \$85,000.

Environmental Activities

Energy conservation will be incorporated as an element, as appropriate, in position descriptions and performance standards of engineers, facility managers and other energy personnel at ARS, OO-WASC, and FS.

USDA agencies participate in the annual Federal Energy and Water Management Awards. Also, ARS is looking into establishing a similar program to recognize ARS Area and Location employees for their contribution to energy conservation.

ARS has incorporated energy efficiency concerns and measures in O&M contract solicitations and evaluation criteria. WASC has made significant progress in the procurement of environmentally sound energy-efficient products, and has updated the O&M contract documentation to require the use of energy-efficient LED exit signs and compact fluorescent bulbs.

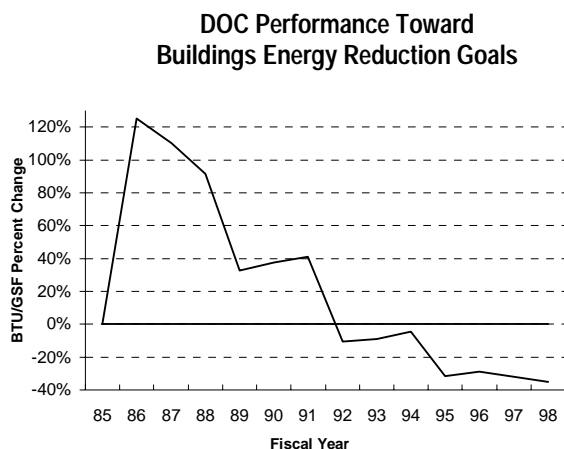
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2. DEPARTMENT OF COMMERCE (DOC)

Energy Efficiency Performance and Implementation Strategies

In FY 1998, the Department of Commerce reported a decrease in buildings energy consumption of 35.1 percent in Btu per gross square foot compared to FY 1985.



Commerce Buildings Energy Use and Costs, FY98

	BBtu	\$ (Thou.)
Electricity	319.2	6,638.6
Fuel Oil	7.8	53.0
Natural Gas	71.3	252.4
Propane	0.8	7.2
Purchased Steam	30.7	459.4
Total	429.9	7,410.6

DOC Bureaus with responsibility for energy and water management in Federal facilities are:

- DOC, Headquarters, Herbert C. Hoover Building (HCHB);
- National Oceanic and Atmospheric Administration (NOAA);
- National Institute of Standards and Technology (NIST);
- Patent and Trademark Office; and
- Bureau of Census.

During FY 1998, NOAA's Northwest Fisheries Science Center implemented water modifications at the Aquaculture Laboratories involving the installation of water recycling systems. Water savings of between 300,000 and 500,000 gallons per day are anticipated,

depending on fish loading. The project also saves energy and has a payback, based on water savings, of less than five years.

NIST's Gaithersburg Campus used a site-wide energy conservation master plan during FY 1998 for planning energy conservation projects to award an A/E energy conservation measures design contract. The contract includes HVAC enthalpy-based economizer controls, HVAC setback controls, installation of water flow restrictors, and low-flow toilets and urinals within site buildings. These measures under design have payback periods of 0.8 to 5 years. A solar film installation has also begun.

NIST also awarded a construction contract to replace chilled water generation refrigeration units. Cost savings may be as high as \$200,000 per year after the four replacements are installed in FY 1999. The construction of two new boilers is scheduled for completion in early FY 1999, followed by the upgrading of the four existing boilers.

The NIST Technical Services Division in Boulder has continued upgrading building insulation, adding an extra R-22 to exterior walls during remodeling. Conversion to energy-efficient lighting is ongoing. A study is planned to evaluate potential energy savings of a central utility plant against the satellite heating and cooling facilities that currently exist for each building.

The new HCHB energy management control system for the four perimeter fans has reduced HVAC energy consumption with the addition of new control valves, damper motors, duct sensors, and a time of day schedule.

Energy Showcases

DOC designated the Herbert C. Hoover Building an energy showcase and has identified eight major projects at an estimated cost of \$3 million and savings of \$745,000 annually.

The Kihei Whale Sanctuary in Kihei Maui, Hawaii, is also designated an energy showcase. NOAA's Western Administrative Support Center installed photovoltaic security lights and solar water heaters. More photovoltaics are planned.

Energy Savings Performance Contracts

NOAA is considering DOE's Super ESPC to fund solar and fuel cell projects for the National Weather Service Pacific Weather Service Offices and Pacific Tsunami Warning Center in Hawaii. Proposed projects include photovoltaics for total daytime electrical power and fuel cells for nighttime power.

Other proposed NOAA Super ESPC projects include upgrading and replacing HVAC units and retrofitting fluorescent lighting fixtures.

Utility Partnerships

DOC is working with GSA and DOE to implement some of the HCHB projects through an energy service agreement with the local utility company, the Potomac Electric Power Company. Using this method, improvements will be completed at no initial cost to the Government.

The Kihei Whale Sanctuary photovoltaic project is being cofunded by DOE's National Renewable Energy Laboratory and the Maui Electric Company.

Environmental Activities

DOC cosponsored the World Energy and Environmental Congress/Environmental Technology Conference (WEEC/ETE) hosted by the Association of Energy Engineers. More than 5,000 professionals from 48 states and 16 countries participated. DOC selected WEEC/ETE as an official Foreign Buyer Program in support of the export potential of the industry it serves.

DOC is a signatory to the Energy Efficiency and Resource Conservation Challenge, and participates on the Interagency Energy Management Work Group. Through this Work Group, DOC has participated in peer review of product recommendations and distributed buying guides to all DOC facility managers.

DOC received the Corporate Energy Management of the Year Award for 1998 from the Association of Energy Engineers. DOC also received a 1998 Federal Energy and Water Management Award for Small Groups in recognition of the alternative financing techniques used in implementing the energy conservation projects at the HCHB.

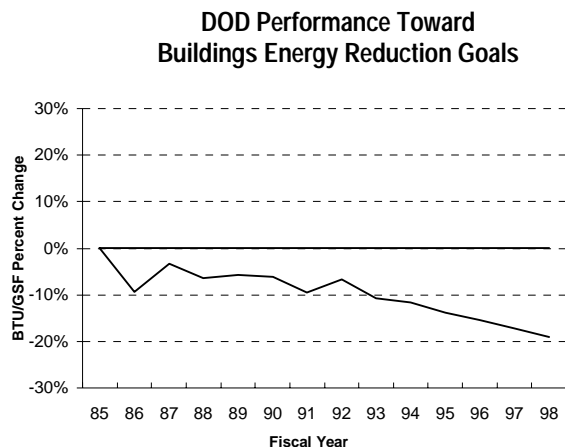
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3. DEPARTMENT OF DEFENSE (DOD)

Energy Efficiency Performance and Implementation Strategies

In FY 1998, the Department of Defense reported a decrease in its buildings and facilities energy of 19.1 percent in Btu per gross square foot compared to FY 1985.



DOD Buildings Energy Use and Costs, FY98

	BBtu	\$(Thou.)
Electricity	84,903.7	1,416,213.6
Fuel Oil	30,769.4	160,998.7
Natural Gas	76,429.2	296,726.2
Propane	1,585.1	14,569.0
Coal	15,497.2	32,942.9
Purchased Steam	10,706.5	163,328.0
Other	676.6	732.0
Total	220,567.6	2,085,510.4

DOD's strategy to reduce its energy consumption has two parts: one directed at what is currently owned and the other at what is planned to be built. The strategy for existing structures focuses on using public and private sector capital to finance energy-savings investments through the use of shared savings contracts and area-wide agreements with local utilities. The strategy for reducing energy consumption in new buildings relies on taking advantage of new design techniques and energy efficient materials to increase energy efficiency. Specifically:

- Wherever practicable, DOD uses the investment capital of private industry and public utilities to make its current inventory more energy efficient. DOD has multi-regional energy savings perfor-

mance contracts (ESPCs)—which cover all fifty states and the District of Columbia—with a combined private sector investment capacity of \$3.2 billion, available for use by all Military Services and Defense agencies. Additionally, the Components are continuing their pursuit of partnerships and demand-side management (DSM) agreements with public utilities. These alternative financing methods are augmented by a modest amount of appropriated funding (\$40 million in FY 1998) to create a balanced program.

- DOD will utilize the principles of "Sustainable Design" in new construction, where it has been determined to produce the lowest life-cycle costs. Sustainable Design methods use the most energy efficient and environmentally sustainable products, optimize architectural design to incorporate local natural conditions, and provide for indoor workplace environmental quality. Demonstration projects undertaken by the Military Departments have shown that this approach to design produces 30 to 50 percent in energy savings with minimal investment.

Confident that it will continue to achieve its goals, DOD understands that significant challenges remain: the demolition and replacement of World War II-era buildings, accomplishment of a significant percentage of fast payback energy savings measures, and changes in the electricity market. Specific observations include:

- New higher-efficiency facilities are often unable to offset the loss of large quantities of space with minimal energy loads, resulting in higher energy density, a trend that may continue in the future as more older facilities are demolished and replaced. In addition, automation of processes tends to produce higher energy usage per square foot.
- There is concern also that electricity restructuring may affect DOD's ability to use private-sector funds to finance energy savings measures. If electric rates decrease substantially, the amount of monetary savings per unit of energy savings will be less, making these arrangements less financially attractive.

Aside from the initiatives for existing or new facilities, the Defense Reform Initiative established the Defense

Energy Support Center (DESC) in 1998. DESC is becoming involved in all facets of the DOD energy program, potentially making significant contributions to DOD's conservation efforts. DESC has completed a study of the regulatory and utility market situations across the U.S., hosted a DOD Joint Utility Privatization conference, as well as several "industry forums" on utilities, and initiated its first World-Wide Energy Conference to be held in January 1999.

All Components continued their efforts to improve energy conservation through energy awareness training and procurement of cost-effective ENERGY STAR® products and products in the top 25 percent of energy efficiency. The procurement of green power and environmentally-friendly products is also strongly encouraged, where cost effective.

DOD continues making progress in completing audits of all of its facilities and is undertaking energy conservation measures that have a payback period of ten-years or less to the maximum extent possible. The Defense Components used a variety of means to accomplish their audits, including appropriated funds, ESPCs and DSM agreements. Some audits have been combined with existing energy databases, such as the Renewables and Energy Efficiency Planning (REEP) Program, and the FEMP Federal Energy Decision Screening (FEDS) system. Appropriated funding was used to hire Architect/Engineer firms to complete audits and project documentation as a single package, while ESPCs and DSMs were used to conduct audits and then install energy savings measures. The Army's Construction Engineering Research Laboratory (CERL) has worked with some Components to develop computer modeling for both auditing and reducing energy consumption.

Use of Solar and Renewable Energy

In early 1998, DOD committed itself to the Million Solar Roofs Initiative. DOD predicts that it will have over 3,000 "solar roofs" in use by the end of FY 2000. In addition to these planned projects, DOD expects to develop and implement other solar and solar-thermal projects. The following projects, totaling 1,226 "solar roofs," were implemented in FY 1998:

- Pearl Harbor Complex, HI – 136 units of domestic hot water heating;
- Naval Air Weapons Station, China Lake, CA – photovoltaic (PV) module test facility, 2 kW;
- Naval Air Weapons Station, China Lake, CA – 4 PV/Diesel Hybrid power systems, 815 kW;

- Naval Auxiliary Landing Field San Clemente Island, CA – PV/Diesel Hybrid power system, 80 kW;
- Santa Cruz Island, CA – PV/Diesel Hybrid power system, 110 kW;
- Marine Corps Base Twentynine Palms, CA – PV/Diesel Hybrid power system, 110 kW; and
- Yuma Proving Ground, Yuma, AZ – Grid connected PV Peak Power Station, 900 kW.

In addition to the Million Solar Roofs Initiative, DOD continues to emphasize the use of solar and other renewable energy sources, where it is cost effective. Passive solar designs, such as building orientation and window placement/sizing, are already being implemented in a variety of building types. The Navy uses the revenue from sales of excess geothermal power at NAWS China Lake, CA, to finance additional energy conservation and technology projects. DOD anticipates more growth in the implementation of renewable energy and active solar technologies due to the recent availability of DOE's technology-specific ESPCs.

The following summary provides a description of additional DOD accomplishments in renewable energy, in addition to those in the Million Solar Roofs Initiative during FY 1998.

- Fort Hood, TX – 22 units of solar (PV) parking lot lighting;
- Fort Hood, TX – 70 units of active daylighting systems;
- Naval Air Station Pensacola, FL – retrofitted 70 air source heat pumps with geothermal;
- Naval Auxiliary Landing Field San Clemente Island, CA – 450 kW wind farm;
- Kadena AFB, JA – two PV-assisted domestic hot water systems (demo project);
- Hurlburt Field, FL – 100 geothermal heat pumps installed in Military Family Housing (MFH);
- Altus AFB, OK – solar (PV) fuel-depot and airfield lighting;
- Los Angeles AFB, CA – solar (PV) street lighting; and
- Pentagon – Solar Dish/Sterling Engine demonstration project – 25kW.

Minimization of Petroleum

Overall, DOD consumption of fuel oil in buildings and facilities decreased by 8.1 percent from FY 1997 to FY 1998. Each Military Component's energy management plan includes a strategy to minimize the use of petroleum. Where cost-effective, heating plants are

being converted to natural gas. With respect to cooling facilities, however, natural gas cooling is cost-effective only in cases where the existing system has failed and must be replaced. Otherwise, the cost of the equipment overrides the increase in efficiency. The Navy has developed a heating and cooling plant optimization program to maintain central plants at optimum operating efficiency where petroleum fuels are still in use. In addition, they are surveying heating and cooling plants, and distribution systems to identify fuel switching, remote monitoring and control, and rebuilding equipment projects.

The Navy participated in a Congressional demonstration program for natural gas technologies. Ten phosphoric acid fuel cells were installed at various locations and are now powering nearly 6,000 tons of natural gas cooling equipment, natural gas heat pumps, and absorption, desiccant and engine driven chillers. The Air Force is continuing to convert some of their installations to natural gas, especially Aviano AFB, Italy and Columbus AFB, OH, where the economic payback is particularly attractive.

The Defense Energy Support Center serves as the implementing agency for the DOD Direct Supply Natural Gas (DSNG) program. The objective of this program is to obtain the most cost effective supply of natural gas for DOD installations while maintaining supply reliability, thereby encouraging the Components to minimize their reliance on petroleum products. In FY 1998, 161 installations participated in the DSNG program and achieved more than \$23.6 million in cost avoidance.

New Space

During FY 1998, the Sustainable Development and Design process was emphasized in the DOD to ensure new facilities incorporate the most current energy management technology within budgetary constraints. The key points of sustainability include:

- Increased energy conservation and efficiency;
- Increased use of renewable energy resources;
- Reduction or elimination of toxic and harmful substances in facilities and their surrounding environments;
- Improvements to interior and exterior environments leading to increased productivity and better health;
- Efficiency in resource and materials utilization, especially water resources;

- Selection of materials and products based on their life-cycle environmental impacts;
- Increased use of materials and products with recycled content;
- Recycling of construction waste and building materials after demolition;
- Reduction in harmful waste products produced during construction; and
- Facility maintenance and operational practices that reduce or eliminate harmful effects on people and the natural environment.

The Navy has taken a lead role and has implemented the Sustainable Design and Development process for all facility work. Demonstration projects have shown that energy savings of 30 to 50 percent are achievable over conventional design. A "Whole Building" design program is being developed which provides a vast array of technology and tools for each engineer/designer. These tools will be critical for future engineering and design excellence. Productivity gains of 5 to 30 percent are achievable, depending on the existing environment and the proposed new facility.

The Army modified all mechanical guide specifications to include DOE energy efficiency requirements as a part of Sustainable Design. The Army also completed a "greening" of guide specifications to include environmentally preferable products where available.

The Air Force has completed a comprehensive sustainable design manual that all three Military Departments are using. They have also updated their Engineering Technical Letters on new construction to include these concepts.

All Military Departments continue to modify guide specifications to include EPA requirements for recycling and specialized products identified as environmentally preferable. The Navy and several Federal agencies are participating in the Building Product Pre-Approval Program to develop a listing of products that meet DOD/Federal construction requirements, are environmentally sensitive, and are energy efficient.

Showcase Facilities

The Military Services have been designating showcase facilities, both in new and existing facilities. The Navy has been particularly proactive by designating two installations (the U.S. Naval Academy, Annapolis, MD, and the Naval Construction Battalion Center, Port Hueneme, CA), rather than individual facilities, as overall showcase activities. In addition, they have designated the Naval Reserve Center at Billings, MT,

as a showcase for demonstrating energy efficient construction.

At the U.S. Naval Academy in Annapolis, MD, electrical and thermal loads were metered to provide an energy usage map. An energy audit was completed and it identified cost-effective projects in high efficiency motors, compact fluorescent lamps, time clocks, photocells and occupancy sensors. Approximately 18 percent of the Academy's fluorescent lighting were converted to T8 lamps and electronic ballasts. Three chillers were converted to high efficiency chillers. Steam traps are being replaced and a heating system master plan is being developed. Construction was completed to install a natural gas driven 200 kW fuel cell to generate electricity and hot water. A demonstration natural gas fired heat pump was installed in a military family housing unit. Construction was initiated on a cooling tower and flash tank to save water being dumped into storm drains. Low flow showerheads were installed in athletic facilities and will be installed along with low flow faucets in military family housing. A compressed natural gas (CNG) fueling station was installed and 100 vehicles were converted to CNG. Training for the utilities operations and maintenance staff is continuing to enhance skills that increase the energy efficiency of systems.

The Naval Construction Battalion Center, Port Hueneme, CA, partnered with local utility companies to conduct an energy audit and to design, construct and finance energy conservation projects. This resulted in a base-wide lighting retrofit that replaced fluorescent fixtures with T8 lamps and electronic ballasts. Two solar hot water demonstration units were installed. Five hundred units of family housing have been renovated with energy efficient lighting and appliances. The central steam plant was decentralized in favor of smaller plants with natural gas heating equipment. Over 400,000 square feet of old, inefficient and maintenance intensive facilities were demolished and their functions consolidated into new, efficient facilities. A natural gas driven fuel cell produces 200 kW of electricity and heats a swimming pool. The base installed a CNG fueling station as well as several electric vehicle charging stations. These support 100 CNG vehicles and 29 electric vehicles.

In addition to the specific installations mentioned above, many advanced energy efficiency technology projects were undertaken throughout DOD. These projects included:

Modifications to Existing Facilities

- Fort Campbell, KY – three barracks – natural gas chillers;
- Fort Hood, TX – 52 units of light emitting diode (LED) traffic signals;
- U.S. Military Academy, West Point, NY – boiler plant – phosphoric acid fuel cell technology;
- Huxtable Pumping Plant, Marianna, AR – Memphis District, Army Corps of Engineers (ACoE) – underwater pumps – change to an environmentally-friendly lubricant which also improves pump efficiency;
- Fort Polk, LA – 4,003 family housing units – ground-source heat pumps;
- Picatinny Arsenal, NJ – main boiler plant – phosphoric acid fuel cell technology ;
- Picatinny Arsenal, NJ – power plant – steam power generators for peak-load-shedding;
- Hill AFB, UT – aircraft maintenance facility – sulfur lighting and HVAC;
- Hill AFB, UT – shipping and receiving facility – lighting and HVAC;
- Robins AFB, GA – industrial electronics lab – lighting initiatives;
- Hanscom AFB, MA – child care center – lighting and HVAC;
- McClellan AFB, CA – technical training center – lighting;
- Kirtland AFB, NM – administrative facility – lighting and HVAC;
- Los Angeles AFB, CA – administrative facility – lighting and HVAC;
- NCBC Port Hueneme, CA – administrative facility – passive and active solar lighting, PV, grey water recovery, and gas-fired heat pump;
- Washington Navy Yard, Washington D.C. – headquarters building – sustainable design; and
- Pentagon and Navy Annex, Washington D.C. – direct digital controls (HVAC) throughout.

New Facilities

- Marine Corps Base Camp Pendleton, CA – physical fitness center – HVAC and materials selection;
- Marine Corps Logistics Base Albany, GA – child development center – geothermal heat pumps and sustainable design;
- Naval Security Group Activity Sugar Grove, WV – barracks – lighting, HVAC, indoor air quality, and materials selection;
- Naval Air Station New Orleans, LA – physical fitness center – sustainable design, occupancy sensors and indoor air monitoring system;

- Naval Training Center Great Lakes, IL – barracks – sustainable design; and
- Barksdale AFB, LA - fitness center – under design for FY 2000 construction.

Procurement of Energy Efficient Products

DOD has an active program to identify and procure energy efficient products, specifically through the Defense Logistics Agency (DLA). DLA, FEMP, and GSA product catalogs are widely used, as well as the Construction Criteria Base (available on CD-ROM and the Internet). Although no specific procurement targets exists within DOD, purchasing agents are encouraged strongly to procure ENERGY STAR® products and products in the top 25 percent of energy efficiency, when they are cost-effective.

ENERGY STAR®

The DOD continues to honor its commitment as an ENERGY STAR® Buildings partner with the DOE and EPA, to encourage the use of cost-effective, energy-efficient building designs and technologies, and to improve personnel productivity and reduce pollutant emissions. This is reinforced by our strong commitment to sustainable design. The Navy reports that approximately 19 percent of their buildings may be eligible to be ENERGY STAR® facilities.

Training

The DOD believes integrated training and education programs are key factors to increasing energy and water conservation. DOD uses training resources available through the Military Services, DOD of Energy, other Government agencies, and the private sector. Each Component reviews its training requirements, identifies the required training resources, and develops implementation plans to meet requirements.

The Army Corps of Engineers and the Army Logistics Integration Agency provide training to Army energy managers. In FY 1998, the Army trained more than 300 people at a cost of more than \$250,000. In addition, they produced an Army Energy Program interactive CD and a Web site (<http://lia.army.mil>). Nearly 400 Navy energy managers received technical training during FY 1998. Personnel attended technical courses offered by universities, associations, and Government agencies. The Navy conducted four sessions of in-house facilities energy management courses in four different Engineering Field Division regions. The courses covered a wide variety of energy-related areas, including Navy policy and instructions, energy data reporting, lighting technology, energy awareness, and project development. The Air Force Institute of Tech-

nology (AFIT) Civil Engineering School at Wright-Patterson AFB, Ohio, provides an Energy Management Training course. This course is given twice a year and consists of a one-week (40-hour) course covering the requirements of the Energy Policy Act. AFIT has also incorporated emphasis on energy efficiency in its other technical courses, and serves as the primary source of energy training for the Air Force. More than 400 Defense Commissary Agency (DeCA) employees received commissary specific "Facility Energy Supervisor Training." This 16-hour course is given annually, by region, to train commissary personnel in the basics of refrigeration, HVAC, lighting systems, and management of refrigeration and HVAC maintenance contracts. The remaining Components use existing Service and private sector training resources to meet training requirements.

All of the Services and many of the Defense agencies have implemented extensive public relations campaigns. These include recognizing non-energy individuals for conservation efforts, producing stickers for light switches, publishing "how-to" and "point of contact" manuals, and supporting energy poster contests.

Energy Savings Performance Contracts

As mentioned above, DOD continues to emphasize the use of alternative funding sources such as ESPCs, DSM agreements and utility partnerships.

The Components either awarded individual ESPCs, or used one of the existing indefinite delivery contracts, such as the Army's multi-regional ESPCs, the Air Force's regional ESPCs, or DOE's Super ESPCs—with the trend moving from base-level to regional ESPCs. The Services have designated various agencies to manage their ESPC programs. The Navy managers are located at the Naval Facilities Engineering Service Center at Port Hueneme, California. The Army uses a decentralized approach with the Huntsville (Alabama) Engineering and Support Center providing support, on a reimbursable basis, to installations and Major Commands (MACOMs), who make the decisions on the details of implementing the contracts. The Air Force uses a two tier operation. Tier One is the technical expertise, program management, and policy development at Headquarters Air Force level, utilizing the Air Force Civil Engineer Support Agency (AFCESA). Tier Two is the actual implementation, at the installation level. To validate energy savings, the DOD uses either the North American Measurement and Verification

(M&V) Protocol published by DOE/FEMP, or includes specific requirements in the individual contract. These methods may involve computer simulation, metering, engineering calculations, and/or audits.

In FY 1998, six more regional EPSCs were awarded, including coverage of the Caribbean and Guam. There were 18 other separate EPSCs awarded and four delivery orders issued. The anticipated annual savings from the awarded contracts and delivery orders is \$8 million and 295 trillion Btu.

Normally, cost savings are used to first pay the contractor and then offset other base operating support expenses. In some cases, however, installations decided to seek a shorter contract term and defer all Government cost savings until contract completion.

DOD is working to overcome a lack of knowledge at the user level in order to further increase the use of EPSCs. As the number of success stories has grown—highlighting the capabilities and advantages of EPSCs—more installations have been willing to try this alternative to achieve energy goals. In addition to a lack of knowledge, the perceived complexity of the contracts has caused a reluctance to use them, particularly by installations that are using DSM agreements extensively. The Services have developed training and education programs to overcome these shortfalls.

In addition to increased usage of EPSCs, the Services have continued to use utility partnerships and DSM agreements as a means to achieve the conservation goals. The Navy has been particularly aggressive with DSMs and utility partnerships, and has over 90 contracts in place. The Navy's utility partnership in the San Diego region was selected for recognition in the National Performance Review last year. The Department of the Navy has also entered into partnerships with 22 other utilities. The Air Force has been promoting DSMs as well, awarding six DSM task orders this fiscal year, which are estimated to save more than 600 billion Btu per year.

Vehicles

In FY 1998, DOD acquired 2,236 AFVs. In addition, DOD received 29 extra AFV credits for acquiring medium- and heavy-duty AFVs, for a total of 2,265 AFVs and credits. The actual total of 2,265 AFVs and credits for FY 1998 represent an increase of 29 percent more the FY 1998 projected total of 1,749 AFVs and credits included in last year's DOD report.

DOD is taking a number of steps in the areas of policy, management and oversight, and budget to achieve compliance with the requirements of Executive Order 13031, "Federal Alternative Fueled Vehicle Leadership." Specific details of the plan are included with the required reporting data. While some obstacles, such as availability of suitable AFV models and availability of adequate alternative fuel infrastructure, remain a significant challenge, DOD is making steady progress toward meeting the requirements of Executive Order 13031.

Environmental Benefits of Energy Management Activities

DOD recognizes that conserving energy will not only save money, but will also result in substantial environmental benefits. Energy conservation helps DOD meet its requirements under environmental laws, such as the Clean Air Act, by reducing emission of air pollutants, such as ozone and carbon monoxide. In addition, energy conservation helps reduce greenhouse gases, such as carbon dioxide. Therefore, DOD closely coordinates its energy management and environmental programs to take full advantage of their synergy. As a result, DOD has been very successful in reducing its greenhouse gas emissions. From FY 1997 to FY 1998, DOD installations reduced their carbon emissions by 1.6 percent. As active participants in the ENERGY STAR® Buildings program, leaders in green power use and strong advocates of sustainable design and development, DOD intends to continue this trend into the future.

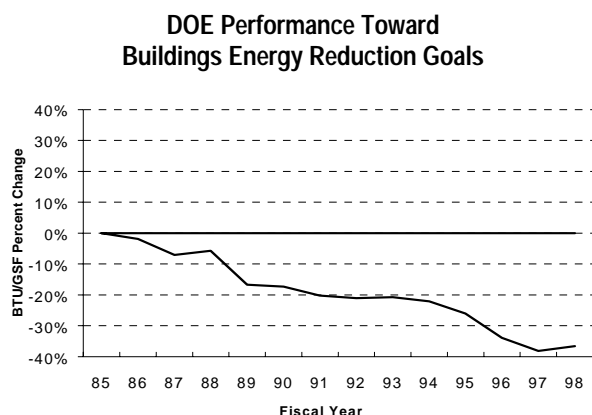
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4. DEPARTMENT OF ENERGY (DOE)

Energy Efficiency Performance and Implementation Strategies

In FY 1998, the Department of Energy reported a decrease in buildings energy consumption of 36.5 percent in Btu per gross square foot compared to FY 1985.



Energy Buildings Energy Use and Costs, FY98

	BBtu	\$(Thou.)
Electricity	10,537.8	138,331.8
Fuel Oil	1,124.5	3,029.5
Natural Gas	6,508.4	21,546.9
Propane	50.0	330.1
Coal	3,397.6	5,196.0
Purchased Steam	1,449.7	12,141.6
Other	58.7	909.3
Total	23,126.7	181,485.0

In FY 1998, the United States Department of Energy (DOE) estimates its energy consumption per gross square foot in buildings will decrease by more than 35 percent compared to FY 1985. This reduction is partially due to reduced mission-related activities and overall downsizing of operations and facilities. As manpower is reduced and facilities are closed, efforts are ongoing to consolidate operations and minimize energy use in vacated buildings. This includes review of heating, ventilating, and air conditioning (HVAC) systems; lighting; transformers; and other building equipment usage.

In FY 1998, the Department's Energy Management Team assisted the efforts of the Energy Management

Steering Committee (EMSC) to reduce energy costs by integrating all energy management activities into DOE program operations. The EMSC is comprised of Federal Energy Management Program and DOE Secretarial Officer representatives. It establishes and implements internal policy for energy management, and integrates these activities into DOE program operations. During FY 1998, the EMSC solicited input for identifying missed opportunities in energy efficiency. From these suggestions, four were selected for the Committee's concentration:

- Expand energy management activities to include DOE surplus facilities;
- Integrate chiller replacement with other energy conservation measures;
- Build energy-efficient procurement into DOE operations; and
- Transfer emerging energy efficiency and fossil energy technologies into DOE operations.

DOE field elements continued implementing energy management performance agreements, which more clearly define energy management performance expectations for achieving cost savings. During FY 1998, the eight DOE operations offices, accounting for almost 80 percent of DOE's annual energy costs, delivered Self-Assessment Reports on their progress toward their agreements. The agreements include conducting site-wide comprehensive facility audits. In FY 1998, site-wide comprehensive facility audits were completed at a number of DOE sites. The audits identified projects that will be funded through private sector financing using energy savings performance contracting or utility incentives. Implementation of these performance agreements will continue.

Many DOE sites have implemented a number of ongoing energy-saving measures resulting from previously funded comprehensive audits such as installing energy monitoring and control systems, replacing mercury vapor lamps with higher efficiency metal halide lamps, replacing old fluorescent lamps and ballasts with high-efficiency lamps and electronic ballasts, installing automatic on-off control systems for lighting, installing and replacing building satellite boilers, and maintaining and upgrading HVAC equipment and systems to optimize performance.

Operations and maintenance procedures are utilized to increase energy efficiency at DOE through efficient operation of buildings, improved preventive maintenance, and improved personnel energy training. Specific operations and maintenance efficiency measures include:

- Using pre-engineered operating schedules to optimize chiller plant operations;
- Window replacement and space renovation;
- Thermograph techniques to locate "hot spots" in energy systems;
- Recalibrating thermostats and humidstats, cleaning coils and louvers, and replacing drip pans;
- Setback and shutdown of laboratory fumehood exhaust systems;
- Using well-managed direct digital control (DDC) systems to monitor and control HVAC equipment;
- A steam-trap inspection and replacement program;
- Annual boiler tune-up procedures;
- Inspection procedures for ensuring proper operation of controls on energy-using equipment;
- Recording hourly performance data for boilers and chiller plants, adjusting for peak performance; and
- Reviewing building modification plans for energy-use features (i.e., lighting, ventilation, heating, insulation, etc.).

Examples of operational and energy efficiency projects accomplished in FY 1998 include:

- The Savannah River Operations Office replaced an oversized compressor used for continuous air monitoring with smaller portable units to reduce electrical consumption by half. Outside lighting was turned off during the day at the Consolidated Incineration Facility (CIF). The potential cost savings of using a dedicated load steam generator for meeting CIF production requirements versus the current practice of utilizing D-Area steam produced by South Carolina Electric and Gas are currently being evaluated. Thermostats in two storage trailers were replaced. Energy savings of \$114,000 were identified. Also, an additional

\$57,000 in utility savings were achieved by the shutdown of an old test reactor facility that was being used as office space.

- The Albuquerque Operations Office completed a number of HVAC and lighting retrofits at the Waste Isolation Pilot Plant (WIPP). The Kansas City Plant (KCP) accomplished several energy conservation activities, including upgrading boilers, installing DDCs, replacing CFC chillers with 134a freon chillers, and installing new steam traps. KCP's plate/frame heat exchanger project is expected to be complete and operational for free cooling during the 1998-99 winter. The Pantex Plant installed photocells on outside lighting, identified and repaired leaking water lines, tuned boilers, right-sized a new air compressor (saving more than \$36,000 per year), installed new steam traps, installed variable-frequency drives, repaired natural gas line leaks, and right-sized chilled water pumps. Pantex also has a water conservation project under construction that will replace domestic water chlorine injection at the sewer plant with sewer water chlorine injection, saving more than 15 million gallons of water per year.
- The Los Alamos National Laboratory (LANL) completed a site-wide energy conservation program that, if implemented during the next 10 years, could save \$4.3 million annually. Five buildings and four transportable offices were audited. LANL installed 64 infrared occupancy sensors in offices, conference rooms, and hallways in six buildings.
- Argonne National Laboratory-East (ANL) completed a lighting study. The 200 Area Heat Recovery Study was also completed. ANL was awarded 25 percent (\$1.1 million) of the available DOE In-House Energy Management funds for three projects: electrical DSM for APS (\$370,000, with a 3.4-year payback), implementing heat recovery in 200 Area Buildings (\$500,000, with a 3.4-year payback), and improving raw water distribution (\$260,000, with a 4.4-year payback).
- The Princeton Plasma Physics Laboratory completed a lighting retrofit study, installing approximately 900 ultrasonic room occupancy sensors, and upgrading the energy management and control system (now a building automation system). A

site-wide energy survey is scheduled for completion during FY 1999. Funding has been approved for exit sign retrofits (\$18,700) and a lighting retrofit (\$195,000).

- The Rocky Flats Environmental Technology Site (RFETS) performed a SAVEnergy audit of 12 buildings along with an energy consumption analysis of 69 other typical buildings, installed two package boilers to improve steam feed efficiency, and reduced exterior lighting at the east and west entry gates.
- Idaho National Engineering and Environmental Laboratory (INEEL) performed facility audits that developed 274 conservation opportunities. If implemented, these would save more than \$51,000 annually. An excess buildings study was completed, finding that actions completed to date are saving \$269,200 per year. During the next five years, an additional \$149,200 will be saved as eight other buildings are removed from service. Total savings are estimated to be \$420,000 annually. INEEL also installed occupancy sensors, setback thermostats, and LED exit lamps.
- Bonneville Power Administration (BPA) invested \$400,000 in two air conditioning retrofit projects at the Celilo Converter Station in The Dalles, Oregon. Two HVAC retrofits are forecast for FY 1999. For the next 10 years, BPA is budgeting \$250,000 per year to update substation HVAC systems. BPA also retrofitted the mechanical system at the Celilo DC Converter Station with a heat exchanger. As a result, a 350-ton chiller could be shut down during the winter. At the Kalispell, Montana, maintenance facility, BPA is installing gas radiant heaters in the garages, reducing the energy bill by 30 percent, or \$2,500, per month.
- The Ohio Field Office's Fernald Environmental Management Project switched to a smaller cooling tower, decreasing the cooling water loop length and reducing pumping energy. The site plans an assessment of its compressed air system in FY 1999.
- Sandia National Laboratory improved their energy management and control system with a more demand-based control strategy, reducing run time of fans and pumps, and reducing simultaneous heating and cooling. One building was completely retrofitted, changing 6,000 lamps from T-12 to T-8 and eliminating more than 1,000 ballasts. Annual savings are conservatively estimated at 250,000 kilowatt-hours, with simple payback in less than 3 years. Twelve remote area buildings were converted from propane to natural gas-fired boilers, saving approximately \$70,000 a year. Also, a 1-million-gallon chilled water storage tank, rated for 10,000 ton-hours of chilled water capacity, was constructed. When this is integrated with the existing chilled water plant, annual savings of around \$150,000 are expected.
- Pacific Northwest National Laboratory improved energy-related operations and maintenance in the William R. Wiley Environmental Molecular Sciences Laboratory. Early results indicate annual savings in the \$100,000 range.
- The Richland Operations Office upgraded the lighting system at the Fuels and Materials Examination Facility. At the Plutonium Finishing Plant, 900 standard fluorescent light fixtures were replaced with T-8s and electronic ballasts, and fan motors were upgraded. Numerous general-purpose facilities also had T-12 fixtures (7,550 in all) replaced with T-8s saving more than 140,000 kilowatt-hours and \$3,533 annually. Also during FY 1998, 13 transformers were removed and 7 were exchanged, reducing energy consumption and costs by more than 325,000 kilowatt-hours and \$7,800.
- The Nevada Operations Office installed energy-efficient lighting in the Remote Sensing Laboratory. This project included replacing magnetic ballasts and T-12 lamps with energy-efficient electronic ballasts and T-8 lamps with reflectors. Total estimated annual savings are \$52,500.
- The Lawrence Livermore National Laboratory completed nine energy conservation projects. The projects consist of DDC system installations, lighting retrofits, occupancy sensor installations, and HVAC upgrades. Total construction cost was \$1.36 million, with cumulative payback in 3.3 years.
- Brookhaven National Laboratory (BNL) received funding of more than \$970,000 for five new projects. These were an energy management and control system optimization, insulation of steam

stations and manholes, an exit sign LED retrofit, installation of a side-stream filter for the Central Chilled Water Facility's refrigeration machines, and HVAC balancing. BNL also completed a prioritization survey, which included 99 buildings and 1.7 million square feet. Water consumption was reduced by more than 20 percent (214.5 million gallons) with an associated cost savings of \$150,000.

- Examples of operational and energy efficiency projects completed at the Bettis Atomic Power Laboratory include roof repairs and insulation, occupancy sensor installations, central heating plant improvements, improvements to the energy management system for building HVAC controls, installation of an efficient vacuum pump system, and the installation of efficient heaters on the Corrosion Laboratory Autoclaves. An energy savings of 14.5 billion Btu was achieved.
- The Oak Ridge Operations Office completed several projects. The Oak Ridge Institute for Science and Education (ORISE) replaced an inefficient electric HVAC system with a digitally controlled system with natural gas heating, and completed a multi-site energy audit, an energy conservation baseline study, a HVAC system study, and a lighting system upgrade. ORISE also completed a multi-phase retrofit construction project at the site's 2714FG Building, which included installing dual glazed windows, attic insulation, and T-8 fluorescent fixtures and electronic ballasts.
- The Federal Energy Technology Center (FETC) completed a preliminary energy audit for both its Pittsburgh, Pennsylvania, and its Morgantown, West Virginia sites. FETC also received \$8,100 from DOE's Energy Efficiency and Renewable Energy Office to complete a lighting retrofit at FETC's day care facility.
- The Federal Energy Regulatory Commission (FERC) has significantly reduced its energy consumption. All incandescent lights in common areas and department head offices were retrofitted with compact fluorescent bulbs, saving 79,120 kilowatt-hours and more than \$6,300 per year, and removing 48 recessed incandescent lights in 16 locations, saving 11,232 kilowatt-hours and nearly \$900 annually. Variable speed drives were in-

stalled on fans and water pumps, saving at least 123,000 kilowatt-hours annually.

- Lawrence Berkeley National Laboratory (LBNL) completed eight energy efficiency retrofits. These measures included lighting retrofits, installing variable frequency drives, variable speed drives, boiler retrofits, HVAC replacements, cooling tower efficiency improvements, and installing lighting controls. Spending totaled \$1,449,000, with estimated annual savings of \$154,000. The annual energy savings of nearly 3,000 megawatt-hours will avoid emissions of 725 tons of carbon dioxide, 1.8 tons of nitrogen oxides, and 0.6 tons of sulfur dioxide.
- The Y-12 Plant proposed installing a System Efficiency and Reliability Improvement (SERI) monitoring system at Chiller Building 9767-3 for FY 1998. Annual savings are estimated at \$25,000.

Energy Showcases

The Nevada Operations Office designated the Nevada Support Facility, the C-1 Building Complex in North Las Vegas, the Mercury Cafeteria, and the NTS Badge Office as energy showcases. Installed technologies include high-efficiency lighting, daylighting, xeriscaping, and energy management and control systems.

Energy Savings Performance Contracts

Obtaining alternate financing for energy efficiency projects is vital to continued energy cost reductions. DOE has awarded five site-specific ESPCs to date and is working on several other projects:

- Savannah Operations Office awarded an ESPC to CES/Way International on March 2, 1998. The preliminary proposal for the first task order includes lighting retrofits, redistribution of HVAC loads to the more efficient central chilled water loop, variable frequency drives, installation of smaller motors in some air handling units, and incorporation of energy management systems. The draft cost estimate is about \$1.8 million, with first year savings of \$291,648. Final review and acceptance of this proposal is anticipated during the second quarter of FY 1999. The decision has been made to pursue development of energy projects via ESPCs. To this end, \$786,000 to develop and implement projects was returned to DOE Headquarters. Other than \$90,000 of previously funded

capital, all other site energy projects have been completed and closed. These funds, along with approximately \$180,000 of outstanding cost funds, will be used to support ESPC efforts.

- The Richland Operations Office's Hanford Site awarded an ESPC in FY 1997 with a contract term of 25 years. The 200 East and 300 Area steam plants were closed and replaced with 42 state-of-the-art package boilers. The new boilers eliminate steam and condensate ground discharges due to the use of a closed loop system, and reduce energy consumption by 30 percent. More than \$108 million in energy and related operations and maintenance expenses will be saved over 25 years.
- Lawrence Livermore National Laboratory (LLNL) signed a Master Task Agreement (MTA) with two energy savings contractors to perform ESP contractor tasks at the laboratory.
- The Headquarters Forrestal Building had an ESPC to perform a building-wide fluorescent lighting retrofit project that was signed in FY 1993. The annual savings amounts to approximately \$400,000 and more than 6 million kilowatt-hours. This ESPC is for 7 years. DOE's share of the savings for the first 3 years was approximately \$109,881 and increased to \$345,922 in the remaining 4 years of the contract.
- Several ESPC efforts at the Albuquerque Operations Office. The Waste Isolation Pilot Project initiated work to utilize DOE's regional Super ESPC. The initial Request for Proposal (RFP) targets the main chillers, variable-frequency drives for the main underground ventilation fans, DDCs for monitoring and control, and several lighting projects. Estimated investment is \$2 million, with a 10- to 11-year payback. KCP provided technical support for the regional Super ESPC. The technical portion of the KCP delivery order was completed. The Pantex Plant originally planned a project which included a minimum of 13 energy conservation measures, resulting in annual energy savings of \$645,850, with a simple payback of less than 8 years. This project was subsequently developed and released as a sole source RFP to NORESO under the regional Super ESPC program. Two million square feet of plant floor space will be audited. Utility incentives of more than \$2.6 million over the project's life will remain

available. Additional delivery orders will be issued under the Super ESPC.

- LANL entered into an agreement with its Support Services Subcontractor (SSS) whereby the SSS would perform ESPC tasks at LANL. One chiller replacement is at the approval stage for construction, one lighting and HVAC upgrade is at the energy audit stage, and a steam plant and another lighting retrofit are at the proposal stage. The replacement of an old centralized steam plant with 14 satellite boilers is now producing annual savings in excess of the guaranteed \$2.3 million per year.
- INEEL began working on a delivery order for the Western region Super ESPC. This initial delivery order will include lighting and transformers.
- The Nevada Operations Office has an ESPC study near completion, which proposes to use efficient technologies in lighting, HVAC, energy management and control systems, and window treatments. A solicitation package is being processed and will be ready in FY 1999. This package includes an audit of 300,000 square feet of building space.
- Oak Ridge National Laboratory engaged an energy services company (ESCO) through the Southeast region Super ESPC. A notice of intent has been issued for a delivery order covering four buildings, including projects involving lighting, chillers, variable frequency drives, and water fixtures. Delivery order negotiations and award are expected in early FY 1999. Other Oak Ridge Operations Office sites will contact ESCOs through the Southeast region Super ESPC in FY 1999.
- FETC completed a preliminary energy audit for both its Pittsburgh and Morgantown sites and has prepared a technical data package. FETC's goal is to award an ESPC using the Mid-Atlantic region Super ESPC.

Utility Partnerships

DOE sites continue to participate in and provide utility company incentives and demand side management programs. Examples include:

- ANL developed an agreement with Commonwealth Edison to provide energy conservation projects under their utility incentive program

initiative. The first delivery order was a pump motor replacement, valued at approximately \$180,000. ANL also continued its participation in Commonwealth Edison's demand-side reduction program, receiving more than \$450,000 in demand reduction compensation. Savings for 1998 are expected to be around \$100,000. ANL also negotiated a reduced rate from the local gas utility.

- The Site Utilities Department of the Savannah River Operations Office entered into negotiations with South Carolina Electric and Gas to modify its existing utility contract to incorporate real-time pricing. This proposal is a 1-year pilot program that will go into effect in December 1998.
- Expected to begin in FY 1998 was a 2-year contract to supply natural gas to the Pittsburgh Naval Reactors Office's Bettis Site. Savings of \$193,000 were expected.
- Pumps at the Strategic Petroleum Reserve's (SPR) Raw Water Intake Structure (RWIS) were increased in size, warranting an increase in the size of Entergy-owned transformers providing power to the RWIS. SPR negotiated an agreement with Entergy to off-set the cost of construction with actual power usage from the site, saving about \$200,000 during the contract period. Three field sites, Bayou Choctaw, Big Hill, and both West Hackberry substations use Entergy's time of use rate for annual savings of approximately \$350,000. Also, the Bryan Mound site is using an interruptible service rate from Houston Lighting and Power.
- BNL initiated negotiations with the New York Power Authority (NYPA). A modified contract is expected in early FY 1999, with the changes estimated to provide over \$2 million in additional savings. FY 1998 was the first full year of natural gas use at BNL. To date, this has saved BNL more than \$190,000 in fuel costs compared to the cost of the previously used fuel oil.
- LBNL equalized its electrical energy rates with LLNL's rates, which have been historically lower, through the 3-Lab (LBNL, LLNL, and the Stanford Linear Accelerator Center) Rebidding System. This will save LBNL an estimated \$800,000 per year.

- The Richland Operations Office began implementing its comprehensive energy management plan and entered into a utility agreement with the Bonneville Power Administration for energy management services.

Vehicles

DOE has an ongoing program to improve vehicle efficiency, including acquiring alternative-fueled vehicles, downsizing vehicles when appropriate, upgrading preventive maintenance programs, improving maintenance techniques, expanding waste minimization programs, implementing driver awareness training, and providing employee outreach.

In FY 1998, DOE acquired 225 alternative fuel vehicles with most being compressed natural gas (CNG) bi-fuel vehicles. Several flex-fueled ethanol vehicles were also acquired. Additional AFV acquisitions are planned by FY 1999.

Most DOE sites have an ongoing employee commuter program. These programs promote using ridesharing and mass transit services, as applicable at each site. A transportation coordinator at each site promotes these efforts, as appropriate.

DOE has been turning over more of its fleet operations to GSA to take advantage of their vehicle programs. This provides the benefit of having an ever more efficient, and less costly to maintain, vehicle fleet.

Environmental Benefits

During FY 1998, DOE continued to focus on reducing chlorofluorocarbons (CFCs) by replacing CFC chillers with new higher efficiency, non-CFC chillers and refrigerant recovery programs. Other measures include fluorescent lamp recycling, procuring recycled goods and products such as printer/copier toner cartridges and paper products, reducing power plant emissions in California, and reducing automobile emissions through the use of compressed natural gas at many DOE sites. Soy-based inks, which are environmentally friendly, are used in some DOE print plants. Site-wide recycling of aluminum beverage cans, batteries, cardboard, paper products, and fluorescent lamps occurs at many DOE sites. Examples include:

- ANL found an outlet for recycling fly ash produced at the ANL steam plant. More than 700 metric tons per year is being converted into a by-product, saving \$40,000 to \$80,000 per year.

- The Savannah River Operations Office replaced four 450-ton chillers in the site's Tritium Area. Also replaced were two 350-ton chillers in the H-Area Canyon facility and one 100-ton chiller in a H-Area Canyon support building.
- The environmental benefits achieved by emission reductions at the on-site steam plants and the off-site power plants are continuous goals of the Savannah River Operations Office site energy management program. The Alternative Fuel Program is an innovative recycling program that targets the waste management needs of regional industry and the fuel needs of the site. Several trial burns of a residual short fiber and coal mixture were conducted during FY 1997, with favorable results. This program will be beneficial to the environment, reduce industry production costs, decrease costs associated with coal consumption, and provide new jobs.
- Supply contracting is conducted at the SPR to minimize biohazards. For example, aerosol spray painting has been banned. Environmental programming eliminated the use of SPR-owned equipment containing polychlorinated biphenyls (PCBs). Also, the SPR has completed an inventory of all utility-owned electrical equipment for PCB content. The amount of PCBs involved was documented, and plans have been developed to assure the PCBs are not introduced into the environment.
- Oak Ridge National Laboratory replaced four chillers totaling 1,746 tons of rated capacity with more efficient, non-CFC chillers. The new chillers save approximately 20 percent in chiller energy. Four additional chillers will be replaced in FY 199 and FY 2003.

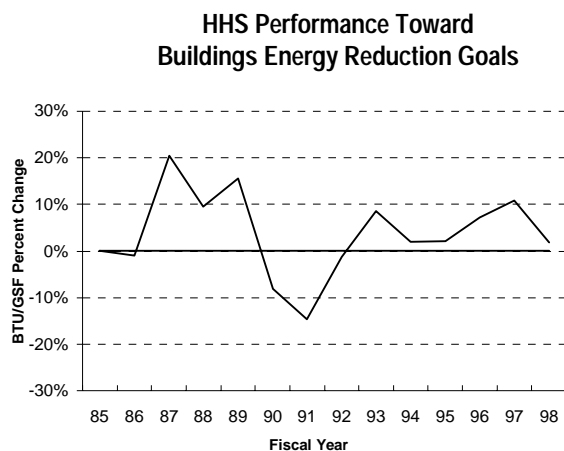
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5. DEPARTMENT OF HEALTH AND HUMAN SERVICES (HHS)

Energy Efficiency Performance and Implementation Strategies

The Department of Health and Human Services reported a 1.8 percent increase in buildings consumption in Btu per gross square foot in FY 1998 when compared to the adjusted FY 1985 baseline. The adjusted baseline decreased the agency's FY 1985 baseline by 11 percent which in turn reflected a decrease in the agency's performance to the mandated reductions, despite the positive achievement of an 8 percent reduction in Btu/GSF from FY 1997 to FY 1998.



HHS Buildings Energy Use and Costs, FY98

	BBtu	\$ (Thou.)
Electricity	2,891.2	46,685.0
Fuel Oil	367.6	2,165.0
Natural Gas	3,332.2	12,714.0
Propane	131.0	900.0
Coal	37.0	92.0
Purchased Steam	194.1	2,672.0
Total	6,953.1	65,228.0

HHS has developed an extensive energy management program to provide both technical and administrative assistance to the Operating Divisions (OPDIVs) on all energy related issues. At the foundation of this program, are the OPDIV 10-Year Audit Plans that outline an action plan for completing comprehensive energy audits. The audits identify energy conservation measures that are either funded directly by the facility or targeted for alternative financing vehicles.

Energy and water conservation projects and initiatives performed during FY 1998 include:

- Office of the Secretary (OS), Hubert H. Humphrey Building, Washington, DC. Solar film was installed on the windows; other solar applications are being analyzed. The energy management control system will be reprogrammed to automatically curtail the HVAC operations during unoccupied hours.
- Centers for Disease Control and Prevention (CDC). HVAC and lighting upgrades were completed at an approximate cost of \$170,200. A water conservation project, that was funded with FY 1997 dollars and completed in FY 1998, is saving approximately 15 million gallons of water per year. This project involved the implementation of a recirculating cooling tower to provide chilled water to HVAC water source cooling equipment. This system previously used cold chiller water that was dumped down the sewer drain after only one pass through the equipment.
- Indian Health Service (IHS). Energy conservation projects, such as energy management control system implementation, HVAC upgrades, lighting retrofits, boiler and chiller replacements, building envelop upgrades, and variable speed drive installations, were completed with \$1,456,000 of non-recurring maintenance and improvement funds (direct agency funding). The use of a ground-source thermal water closed loop system for heating an IHS hospital eliminated the need for natural gas boilers, thus reducing the emissions of the boiler operation.
- National Institutes of Health (NIH) Bethesda Campus, Bethesda, Maryland. The Bethesda Campus Power Plant is being expanded to provide the necessary utilities for new buildings on campus and renovated existing buildings. During the design and construction of the facility renovation, energy conservation measures have been implemented such as, high efficiency chillers with steam turbine drives, variable frequency drive fan motors for the cooling towers, chilled water variable speed secondary pumping, and free cooling capabilities from a heat exchanger which uses condenser water to generate chilled water during winter months. The annual estimated savings of these measures is

\$1.59 million or 6 percent of the annual energy costs.

IHS hospitals in the Aberdeen Area make extensive use of solar technologies, with current efforts under way to improve the efficiency of their operation. During FY 1998, one of the facilities installed a thermal protection system to prevent dangerous overheating. Solar lighting was also planned for one of the hospitals in FY 1998.

Energy Showcases

HHS has designated the National Institute of Health (NIH) Frederick Cancer Research and Development Center in Frederick, Maryland, and the Hubert H. Humphrey Building as energy showcase buildings.

Training

OS held a two day seminar in FY 1998. HHS energy managers and engineers from across the country attended to hear speakers from DOE, the National Renewable Energy Laboratory, Pacific Northwest National Laboratory, HHS, and private industry present a wide array of energy efficiency topics. These included energy auditing, renewable energy, water conservation, ESPCs, energy awareness, energy-efficient operations and maintenance, competitive utilities, greening of the government, fuel procurement, facility recommissioning, and new technologies.

Funding

Although HHS is fine-tuning each OPDIV's energy management plan in order to fully meet the Executive Order 12902 energy targets, HHS needs further funding and support staff to identify and implement projects. In prior years, direct agency funding was the primary vehicle for implementing energy projects. Unfortunately, in FY 1998, funding for energy and water efficiency projects decreased by 24 percent to \$2.2 million.

Energy Savings Performance Contracts

In FY 1998, several HHS facilities entered into ESP-type contracts and are evaluating the energy contractors' recommendations for conservation projects. The outlook for FY 1999 is promising, as many more HHS facilities are expected to sign energy savings performance-type contracts.

The IHS Aberdeen Area office is working with engineers from the IHS Engineering Services in Seattle to prepare an ESPC with DOE. A delivery order is expected to be issued in FY 1999.

The IHS Oklahoma Area is working on an ESPC with Trane for conservation projects at a hospital and three health clinics. A contract is planned for FY 1999.

A Super ESPC is being pursued by the Oklahoma City Area that includes three major service areas and hospitals. The Area Office has been working with DOE and NREL to review the potential projects and a MOU has been signed. The six ESCOs under the Super ESPC have met with the Area office to discuss their capabilities and qualifications and the Area Office procurement and technical staff have attended Super ESPC training. Currently, IHS is considering the implication of a compact of the facilities and the long term financial obligation of transferring such a contract to a tribe.

Utility Partnerships

The NIH Frederick Cancer Research and Development Center (FCRDC) located in Frederick, MD, began implementation of energy conservation projects in FY 1998, under the Basic Ordering Agreement with Allegheny Power, the local utility. In FY 1998, the NIH campus began the process of choosing an ESP-type contract to finance energy and water conservation measures that produce stable, measurable, and verifiable savings. This contract is expected to be signed in FY 1999.

The Food and Drug Administration (FDA) National Center for Toxicology Research (NCTR) entered into a GSA Area Wide Public Utilities contract with Entergy. This contract has been valued at \$9 million in savings over an eight year period. The annual energy savings have been estimated at 20 to 27 percent. The final contract is expected to be signed in early FY 1999. The Food and Drug Administration (FDA) is establishing a contract at the Module One facility in Laurel, Maryland. This contract will be with the local utility and is expected to be finalized in FY 1999. In addition, an ESPC for a lighting retrofit project will be signed in FY 1999 for the FDA Winchester Analytical Engineering Center in Woburn, Massachusetts.

The Program Support Center (PSC) Parklawn Building will sign a utility agreement in FY 1999 to implement lighting, high-efficiency motors, and water-saving projects. Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia, are utilizing a GSA Area Wide Public Utilities to implement energy projects in the one million square feet of buildings. They are currently awaiting the utility company's proposal and

after evaluation of the proposal will determine the implementation action plan.

HHS facilities are beginning to purchase natural gas on the spot market. In FY 1998, PSC will purchase deregulated gas from Washington Gas Energy Services, with expected savings of approximately \$25,000 for the year. The IHS Oklahoma Area is also considering this type of purchase. The NIH Bethesda Campus purchases most of its natural gas on the spot market through the Defense Energy Service Center's Natural Gas Program.

Environmental Activities

HHS contracts offices follow procurement guidelines established in the CFR when purchasing energy efficient equipment. At the IHS Billings Service Area, new energy-efficient products are reviewed by the Facilities Management Branch engineers using the *Sweet Source* product information catalog.

The CDC water conservation project is saving 15 million gallons of water annually. The new IHS ground-source thermal water closed loop system for heating an IHS hospital eliminated the need for natural gas boilers, thus reducing the emissions of the boiler operation.

The NIH Bethesda Campus has made significant strides in reducing overall source emissions by converting the central boilers from petroleum-based fuel to natural gas and upgrading the control and burner systems for more efficient operation. The conversion has reduced fuel oil consumption by 88 percent, from approximately 9,720,000 gallons in 1995 to 1,150,000 gallons in 1998 and the power plant's total boiler emissions were reduced from 866 to 144 tons or 83 percent.

In FY 1998, the HHS Energy Officer and the OPDIV energy coordinators met with EPA to discuss the Federal ENERGY STAR® Buildings Program. Each HHS OPDIV will sign a memorandum of understanding for the program. These will be forwarded from the HHS Energy Office to each OPDIV head with a brief description of the program and a letter stressing the benefits of energy conservation and becoming part of the ENERGY STAR® program.

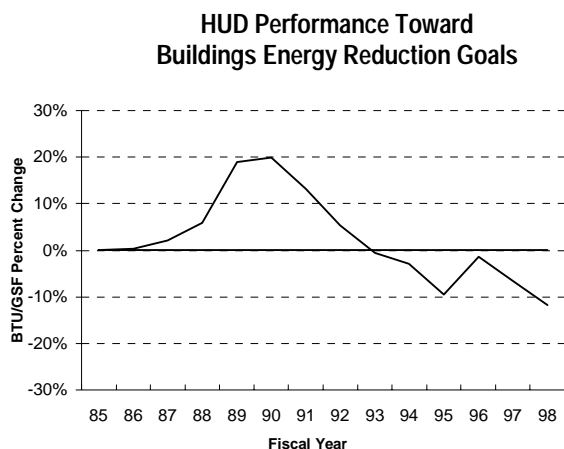
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6. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD)

Energy Efficiency Performance and Implementation Strategies

During FY 1998, the Department of Housing and Urban Development reported a 11.8 percent decrease in buildings consumption in Btu per gross square foot compared to FY 1985.



HUD Buildings Energy Use and Costs, FY98

	BBtu	\$ (Thou.)
Electricity	83.2	1,803.0
Natural Gas	0.2	2.2
Purchased Steam	19.7	295.0
Total	103.1	2,100.2

The following are energy conservation measures (ECMs) completed at the HUD Headquarters Building during FY 1998:

- The variable-frequency drives upgrade on the building's eight main air handlers and return fans was completed in December 1997.
- The automated control system for on/off control of the building's 1,584 window fan coil units was completed in March 1998.

As a result of these and previous efforts, an energy savings of 6.4 billion Btu was realized over FY 1997. An additional energy savings of 4 billion Btu is projected for FY 1998.

Initiatives for FY 1999 include a lighting retrofit throughout the headquarters building. T-12, 34-watt lights, and magnetic ballasts will be replaced by T-8, 32-watt lights with reflectors and electronic ballasts.

HUD plans to use local utilities to perform an energy audit, which should help identify additional ECMs that could be implemented in the future.

Energy Showcase Facilities

The HUD Headquarters Building is a DOE Energy Saver Showcase facility. An audit will be performed during FY 1999 to incorporate advanced technologies and practices for energy efficiency, water conservation, and solar and other renewable energy sources.

Training

HUD's energy coordinators attended the ESPC workshop given through DOE's Federal Energy Management Program.

Funding

Funding for HUD's ECMs has been provided by the GSA Energy Conservation Program, by DOE, and through HUD's repair and alteration funds as they are available.

Utility Partnerships

During FY 1998, HUD continued participation in Potomac Electric Power Company's Electrical Load Curtailment Program. This will continue in FY 1999.

Vehicles

HUD has only four EPACT-covered fleet vehicles, two of which are exempted. HUD proposes to acquire two alternative fuel vehicles through their delegated commercial leasing procedures. This is dependent on the leasing industry having readily available vehicles.

Environmental Activities

Products purchased during FY 1998 were all in compliance with Federal regulations regarding ENERGY STAR® equipment using the GSA schedule.

HUD has implemented a recycling program and has replaced existing CFC chillers with non-CFC energy-efficient chillers.

Management employees' performance evaluations include energy management and maintenance criteria. Five HUD employees were recognized for their contributions for energy management programs through the FEMP "You Have the Power" energy awareness campaign.

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7. DEPARTMENT OF THE INTERIOR (DOI)

Energy Efficiency Performance and Implementation Strategies

In FY 1998, the Interior Department reported a decrease in energy consumption in buildings of 15.6 percent in Btu per gross square foot compared to FY 1985.

Interior Performance Toward Buildings Energy Reduction Goals



Interior Buildings Energy Use and Costs, FY98

	BBtu	\$ (Thou.)
Electricity	1,523.8	32,909.7
Fuel Oil	513.7	4,349.7
Natural Gas	1,210.2	5,532.0
Propane	451.0	3,184.3
Coal	1.6	1.0
Purchased Steam	45.9	701.9
Other	1.2	3.2
Total	3,747.4	46,681.8

The DOI Energy Management Plan for Buildings and Facilities, revised in June 1995 to meet requirements of EPACT and Executive Order 12902, provides guidance to its Bureaus in establishing and implementing energy management programs.

The Bureau of Reclamation recently issued a supplement to *Departmental Manual 752 Energy Management Program*. The supplement establishes policy on buildings powered by station service, beneficial landscape practices, and use of recovered materials.

Each bureau has developed, or is developing, a bureau energy management plan based on the guidance provided by DOE.

Operation and maintenance procedures have been adopted at many DOI bureaus that require all purchases of energy-consuming devices be evaluated on energy efficiency characteristics. Procedures also require the replacement of incandescent lamps with compact fluorescent lamps, fluorescent lamps with lower wattage and more efficient lamps, worn-out air conditioners and heat pumps with high energy rating units; and faucets and toilets with low-water consumption units. Some procedures also call for the installation of timing lights and motion sensors, improved landscape watering practices, and installation of low-water xeriscape plants in certain areas.

In FY 1998, DOI established the Maintenance Management Systems Working Group in conjunction with the development of the FY 2000 budget request to conduct a review of maintenance data requirements, systems, and applications.

The following energy and water conservation audits and initiatives were under way during FY 1998:

Bureau of Reclamation

- Audits performed in the Bureau of Reclamation included the Fort Simcoe and Columbia Basin Job Corps Centers. Preliminary audits of several sites in Boulder City, Nevada, were also conducted.
- Xeriscaping was used at the newly constructed Centennial Job Corps Center in Nampa, Idaho. Drip irrigation, rock mulch, drought-tolerant grasses, and water-efficient spray heads were all utilized. Xeriscaping is also being implemented at the Lower Colorado Regional Office.
- A water conservation visitor center is being planned at Folsom Dam, California.

Fish and Wildlife Service

- The Fish and Wildlife Service is in the process of completing the Mora National Fish Hatchery and Technology Center of the Southwestern Fisheries Technology Center in New Mexico. Extensive water reuse facilities are incorporated into the design of the hatchery. In FY 1998, the Service received \$2 million in construction funds to complete the project. This enabled the unfunded por-

tion of Phase III (office and wet laboratory buildings, settling pond, paving, and other projects) to be completed and operations to begin.

- The Fish and Wildlife Service nominated several sites for energy audits utilizing the SAVEnergy survey program conducted through DOE's FEMP. In FY 1998, five Fish and Wildlife Service surveys were completed. These surveys identified energy conservation opportunities and retrofits whose estimated costs exceeded FY 1998 funding.

The Main Interior Building Complex (a GSA-delegated facility) implemented retrofits, including chiller replacements, and contracted for lighting improvements in the Main Interior Building. Annual savings resulting from the two retrofits are estimated at \$489,000.

DOI recognizes the cost-saving potential for the development and implementation of renewable energy resource projects and has developed a Renewable Energy Plan, which was signed in February 1998 and forwarded to DOE. The plan requires identification of opportunities for development of alternative energy resource projects if development of the resource is economically, environmentally, and technically feasible and energy produced can be used by DOI facilities.

Some bureaus, including the Fish and Wildlife Service, require their engineers to implement use of passive solar strategies, as appropriate, in the design of new buildings.

The Fish and Wildlife Service retrofitted a solar project at Sand Lake National Wildlife Refuge (NWR) in South Dakota, and initiated a solar cooling project at Cabo Rojo NWR in Puerto Rico. Future renewable energy projects include photovoltaic systems at the Farallon Islands NWR in California and the Havasu NWR in Arizona. A solar hot water system is planned for the Imperial NWR, Arizona.

The National Park Service (NPS) uses an innovative strategy to augment funding for some photovoltaic projects. Photovoltaic installations are used as training sessions, for which fees are charged. NPS uses these fees to subsidize the project costs. In FY 1998, this strategy was used to install photovoltaics at a remote ranger station on the Schivitz Plateau at Lake Mead National Recreational Area in Nevada.

Two off-grid 6.4-kilowatt photovoltaic systems were activated at the Channel Islands National Park in

California in May 1998. In August 1998, four 9-kilowatt equivalent solar hot water systems were installed on the rooftops of the residential units. Due to the expense of delivering fuel from the mainland, the simple payback period is very short at just over 2 years.

The Bureau of Land Management (BLM) is exploring the possibility of installing two or three wind turbines (30 to 50 kilowatts each) at the Weber Basin Job Corps Center in Ogden, Utah.

In 1998, at BLM's Parriette Wetlands Administrative Facility in Utah, a photovoltaic system, including 16 64-watt modules, batteries, inverters, and power center were installed. The procurement included three other photovoltaic systems for sites in Arizona, Idaho, and Alaska. Quantity purchases help keep prices competitive.

NPS and BLM have completed, or identified for completion, 114 photovoltaic projects throughout Alaska, Arizona, California, Colorado, Florida, Hawaii, Idaho, Michigan, Mississippi, Montana, North Carolina, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

Energy Showcases

Two Fish and Wildlife Service buildings were recognized as showcases by DOE in FY 1998. The Wichita Mountains Visitor Center in Indianola, Oklahoma, displays earth coupled heat pumps. The Prairie Learning Center in Prairie City, Iowa, displays earth coupled heat pumps, earth sheltering, clerestory lighting, low-flush plumbing fixtures, and wetlands waste water treatment.

Reclamation has four showcase facilities. Glen Canyon Dam Visitor's Center demonstrates energy conservation within a hydroelectric generating facility. Lighting retrofits and occupancy sensors are being installed throughout the facility. Toilets were replaced with low-flush units, single pane windows with insulated glass, and the existing solar hot water heating system was repaired.

The Denver Federal Center showcase facility is a joint effort between Reclamation, GSA, DOE, EPA, the local water utility, and four manufacturers of water-saving devices. This 2-year project demonstrates and evaluates water conservation technologies and provides a learning center for other Federal agencies, private organizations, and the general public. The project will

also document the performance of water conservation devices, determine life-cycle cost savings, and determine if improvements are needed before deployment in the Federal sector.

Reclamation's Pacific Northwest Region showcase facility is the new Centennial Job Corps Center in Nampa, Idaho. A dedication ceremony for the new center was held in October 1997. Included at the October dedication ceremony was an exhibit that featured the energy-efficient and water-conservation technologies.

The Davis Dam Building in Bullhead City, Arizona, highlights lighting and electric savings opportunities.

NPS's showcase is the Golden Gate Club at Golden Gate National Recreation Area in California. The U.S. Geological Survey's EROS Data Center's Mundt Building in South Dakota exhibits mechanical upgrades.

Training

Energy managers involved in building energy efficiency and water conservation have attended workshops offered by DOE, GSA, EPA, the Association of Energy Engineers, public utilities, and at Bureau energy coordinators meetings. Training material is routinely distributed, and energy managers are encouraged to attend as much training as local funding will allow.

DOI was well represented at the SOLTECH conference in Albuquerque, New Mexico, in June 1998 and at DOE's Energy '98 Conference in Bellevue, Washington, in August 1998.

DOI was represented in the DOE video on ESPCs and continued collaboration with DOE and Camber Corporation in the development of the Federal Energy Manager Job and Task Analysis effort in FY 1998.

Funding

DOI funded \$8.3 million in retrofit and capital equipment for FY 1998. Estimated project funding for FY 1999 is \$8.2 million, and \$6.3 million for FY 2000. As in previous years, DOI funding for retrofit and capital improvements comes from the Bureaus' operations, maintenance, construction, and rehabilitation funds.

In GSA-assigned buildings, GSA's energy fund will continue to be a primary source of funding for retrofit projects.

Energy Savings Performance Contracts

DOI continues to explore locations where ESPCs might be effectively implemented. Using indefinite delivery, indefinite quantity contracts developed by NPS and DOE is expected to increase familiarization with and the number of ESPCs. Bureaus are very optimistic about participating in DOE's Super ESPCs. In February 1998, DOI signed a memorandum of understanding with DOE for participation in the DOE regional Super ESPCs.

Presently, at the Lake Mead National Recreational Center in Nevada, NPS is exploring the possibility of building five park entrance stations that would be powered by photovoltaics and heated by ground source heat pumps. NPS is very interested in using DOE's technology-specific, photovoltaic Super ESPC to complete this project.

Utility Partnerships

Each Reclamation office is encouraged to periodically check with their utility to determine if any incentives are being offered.

The U.S. Geological Survey consults with servicing utilities at least annually to ensure that each facility has the lowest possible rate schedule. High-energy-use systems are scheduled to take advantage of off-peak rates.

Fish and Wildlife Service field stations also maintain contact with their local utilities in order to obtain any available demand-side management services.

NPS and Pacific Gas and Electric Company negotiated an innovative demand-side management contract that pays NPS for energy saved. To obtain the rebates, a preretrofit and postretrofit energy audit is performed to identify the savings.

Vehicles

Currently, DOI has approximately 400 alternative fuel vehicles in about 39 states at more than 100 locations. About 75 percent of DOI's AFVs use an alcohol-based fuel (primarily methanol/gasoline blend) and 20 percent use natural gas or propane. Less than 5 percent of the AFVs are powered by electricity or bio-diesel derived from industrial rapeseed, canola, or soybeans. With a few exceptions, Interior's AFVs with dedicated natural gas fuel systems and those that can use methanol (M-85) and ethanol (E-85) are leased through the General Services Administration. Vehicles in the fleet that have been retrofitted to operate on natural gas and liquefied petroleum gas are Interior-owned.

DOI has established a number of high profile initiatives at Yosemite National Park, Grand Canyon National Park, Zion National Park, Golden Gate National Recreation Area, Arcadia National Park, Rocky Mountain National Park, Back Bay National Wildlife Refuge, and Patuxent National Wildlife Refuge that demonstrate commitment to the use of AFVs in light duty vehicles, as well as transit vehicles and medium and heavy duty vehicles. Most of these projects are possible through the willingness of partners in both the private and public sectors.

Interior bureaus set aside \$250,000 in FY 1998 to cover the incremental cost of AFVs leased through GSA. For FY 1999 and beyond, Interior proposed and successfully coordinated with GSA in establishing Interior as their first customer to have the incremental cost of AFVs leased through the GSA Interagency Fleet Management Program spread among all vehicles leased through GSA. This new financing approach will result in a significant increase in the introduction of AFVs into Interior's fleet.

Environmental Activities

DOI is currently making every effort within budgetary limitations to implement applicable rules and regulations regarding procurement of energy-efficient goods and services. DOI participated in the Best Practices Work Group for Environmentally Preferable and Energy-Efficient Purchasing sponsored by OMB, EPA, and DOE.

In June 1998, NPS sponsored a strategic planning workshop called "Making the National Parks a Showcase for an Energy Efficient Future." The workshop was a significant step in a broader, collaborative, sustainable energy initiative between DOI and DOE. The workshop will promote energy efficiency and renewable energy technologies and help educate park visitors.

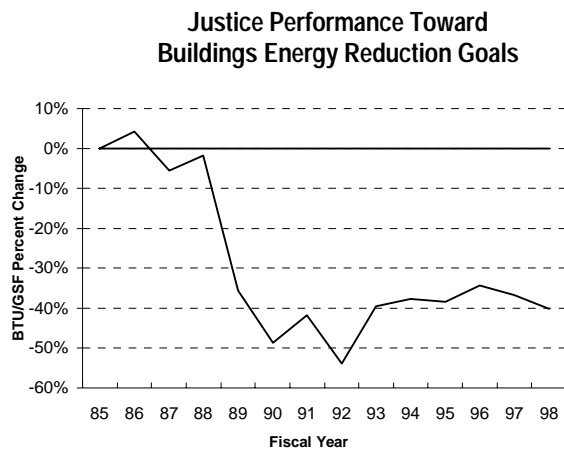
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8. DEPARTMENT OF JUSTICE (DOJ)

Energy Efficiency Performance and Implementation Strategies

In FY 1998, the Department of Justice reported a decrease of energy consumption in buildings of 40.2 percent in Btu per gross square foot compared to FY 1985.



Justice Buildings Energy Use and Costs, FY98

	BBtu	\$ (Thou.)
Electricity	3,076.2	48,762.5
Fuel Oil	93.4	594.2
Natural Gas	4,266.7	20,906.7
Propane	9.7	5.6
Coal	67.2	68.0
Purchased Steam	250.8	2706.9
Other	19.0	0.0
Total	7,783.0	73,043.9

DOJ has reviewed its energy management and water conservation plans. During FY 1999, an extensive review of these plans will be undertaken to incorporate the most recent Executive Order requirements.

Energy conservation highlights from FY 1998 include:

Bureau of Prisons (BOP)

- Federal Correctional Institute (FCI) Schuylkill, Pennsylvania. A project was established to replace and upgrade lighting fixtures. Annual electrical savings are estimated to exceed 840,000 kilowatt-hours. Simple payback will be within six years.

- United States Penitentiary (USP) Lewisburg, Pennsylvania. A lighting retrofit was performed. Annual electrical savings are estimated at more than 1 million kilowatt-hours. Simple payback will occur within four years.
- FCI McKean, Pennsylvania. The HVAC system was upgraded, providing estimated annual savings of approximately 663,000 kilowatt-hours of electricity and 65,000 therms of natural gas. Simple payback will occur in four years.
- FCI Fairton, New Jersey. A lighting retrofit was performed, producing estimated annual electrical savings of more than 1 million kilowatt-hours. Simple payback should occur in less than one year.
- Metropolitan Correctional Center, New York, New York. Certain light fixtures were replaced, producing estimated annual electrical savings of almost 80,000 kilowatt-hours. Simple payback will occur in seven years.
- USP Marion, Illinois. Selected windows were replaced, producing estimated savings of more than 170 tons of coal annually. Simple payback will occur in 10 years.
- FCI Petersburg, Virginia. Lighting fixtures in the housing units were replaced, producing estimated annual savings of more than 180,000 kilowatt-hours. Simple payback will occur in seven years.
- USP Leavenworth, Kansas. Lights in three cell houses were replaced, producing estimated annual savings in excess of 680,000 kilowatt-hours per year. Simple payback will occur in five years.
- FCI Oxford, Wisconsin. Selected HVAC units were upgraded, providing estimated annual savings in excess of 8,000 kilowatt-hours per year, with significant monetary benefits from decreased maintenance. Simple payback will occur in five years.

BOP completed four energy audits in FY 1998, bringing its total number of surveys completed to 70.

Federal Bureau of Investigation (FBI)

- J. Edgar Hoover building (JEH), Washington, DC. At least \$690,000 worth of energy conservation projects will be implemented in FY 1998 and 1999, including replacing garage lights, installing high-efficiency motors, and installing variable-speed drives for pumps. JEH received an energy audit by GSA in 1996. As a result, a new energy management system is being designed. GSA has allocated \$1.8 million to install this system; contract award was expected by November 1998. Two additional lighting projects are expected to be implemented in FY 1999.
- FBI Academy, Quantico, Virginia. Equipment is being converted from fuel oil to natural gas. The 25-year-old chiller refrigeration equipment is being replaced with models 30 percent more efficient.

The new FBI laboratory in Quantico has been designed with the latest energy-saving methods appropriate for its function. The FBI's Clarksburg, West Virginia, facility also incorporated many energy-conservation features in its design and construction.

Immigration and Naturalization Service (INS)

- The Batavia, New York, Federal Detention Facility was completed in FY 1998. Project design specified the use of energy-efficient materials and equipment. Electrical power is supplied by an INS-owned transformer rather than from the local utility, saving more than \$60,000 annually.
- The Krome Service Processing Center in South Florida is being designed with energy-efficient materials and equipment, including solar.
- A Border Patrol Station in Remey, Puerto Rico, is being designed and built using energy-efficient material and technologies, including solar electrical backup.

Energy Showcases

INS will attempt to showcase three facilities in FY 1999. DOJ will establish a goal of designating at least one facility from each of its bureaus in FY 1999 as a showcase facility.

Training

DOJ periodically conducts meetings with its Bureaus to disseminate information and provide guidance.

Energy conservation has been a topic at BOP's bi-annual Facilities Management training course. The course generally has 25 participants from throughout BOP. A life-cycle costing workshop has been provided at some of the more recent courses.

A videotape highlighting energy conservation projects completed at the Federal Prison Camp in Duluth, Minnesota, was produced in FY 1995 and has recently been edited to update its content. This tape will be shown at training sessions.

Energy Savings Performance Contracts

BOP entered into an energy savings performance contract (ESPC) in FY 1996 at FCI Phoenix, Arizona. This ESPC is for the installation of a solar hot water heating system that will provide a large percentage of the domestic water. Construction was to begin in early FY 1998. Operation of the system is anticipated to begin in early FY 1999.

Utility Partnerships

Electric and natural gas utilities have worked with BOP by providing services, guidance, and financial incentives involving lighting and HVAC systems. The cost savings generated by these efforts have allowed for the funding of additional projects.

Environmental Activities

BOP and FBI include energy and water conservation criteria in their position descriptions and performance evaluations for relevant staff members.

DOJ encourages its Bureaus to establish separate award programs for energy and water conservation. Employees are also nominated for the annual Federal Energy and Water Management Awards.

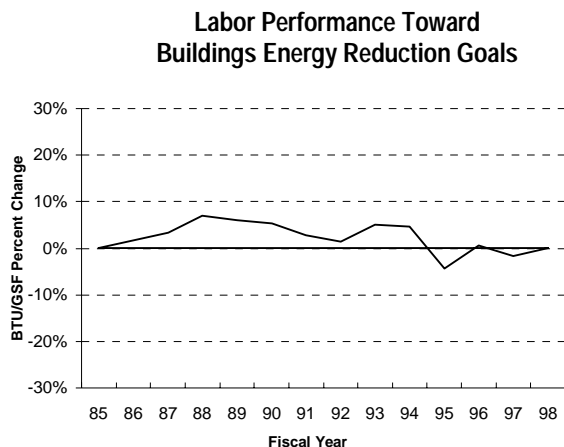
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9. DEPARTMENT OF LABOR (DOL)

Energy Efficiency Performance and Implementation Strategies

In FY 1998, the Department of Labor reported a 0.01 percent increase in buildings consumption in Btu per gross square foot compared to FY 1985.



DOL Buildings Energy Use and Costs, FY97

	BBtu	\$(Thou.)
Electricity	791.9	16,187.8
Fuel Oil	209.4	1,258.0
Natural Gas	1,108.9	5,566.4
Propane	16.7	287.8
Coal	14.7	49.4
Purchased Steam	48.7	686.7
Total	2,190.2	24,036.1

Six energy audits were completed during FY 1998. The North Texas Cement Quarry and Plant Midlothian, TX, part of the DOL's Mine Safety and Health Administration, was audited under DOE/FEMP's SAVEnergy Audit Program. Implementation of identified energy conservation measures will be completed using DOE's Central Region Super ESPC program.

The Job Corps, which falls under the Employment and Training Administration has been particularly active during FY 1998. Total square footage for Job Corps facilities increased slightly during the fiscal year, and now stands at 16.7 million square feet. Approximately one-third of the space is leased. The contract-operated Job Corps facilities have reduced fuel oil usage by 45 percent since 1985. Consumption has dropped from about 2.6 million gallons during the 1998 fiscal year.

Whenever an alternative energy source is available, life-cycle cost-effective, and practical, Job Corps facilities are converted to that energy source.

There is one Job Corps Center that utilizes solar energy for domestic water heating. It is anticipated that an existing non-functional solar water heater at the Gary, Indiana Center will be decommissioned.

Energy Showcase

The Frances Perkins Building has been designated as a showcase facility and engages in activities to display how it is saving energy. Participation in DOE/FEMP's "You Have the Power" campaign has once again proved valuable to energy conservation efforts at the Department of Labor.

Training

Six Department of Labor employees have attended and participated in FEMP-sponsored training, conferences, and other energy/environmental seminars throughout the year.

Funding

The Department of Labor receives most of its funding for energy efficiency projects from the General Service Administration's Federal Buildings Fund. This funding is supplemented by monies from the Department's operation, maintenance, repair, and construction accounts, as available.

Energy Savings Performance Contracts

The Job Corps is currently involved in two projects using the Department of Energy's Regional Super ESPC program. The DOE Central Region selected the Gary, Indiana Job Corps Center as one of two Federal facilities to be included in their Request for Proposal solicitation.

DOE awarded an Indefinite Delivery/Indefinite Quantity contract. The Department of Labor developed and issued a Delivery Order Request for Proposal. The selected energy service company is currently working on its project proposal. It is anticipated that the project scope will include lighting upgrades, HVAC equipment and controls, and the refurbishment and decommissioning of a non-operational solar hot water heating system.

Utility Partnerships

The Job Corps is currently working on two projects which utilize GSA Area-Wide Contracts. These projects include, but are not limited to, HVAC improvements, lighting upgrades, window replacements, and building control system improvements.

Environmental Activities

The Department of Labor has developed a strategic plan in accordance with requirements of Executive Orders with the goal of improving waste prevention, recycling, and the purchase and use of recycled-content and environmentally preferable products and services. A DOL Agency Environmental Workgroup has been established with a designated Recycling Coordinator. DOL is developing a Web site on recycling to educate all employees and the public on recycling within DOL. Employees have submitted suggestions on achieving recycling goals.

Recycled carpet has been purchased by DOL agencies during the fiscal year and new contracts are being reviewed for recycled content in materials. Toner cartridges are now recycled. A contract with a recycling company has been established, with revenues going to the DOL Child Development Center. Containers are provided throughout the Frances Perkins Building for recycling newspapers, cans, bottles, and white paper. The purchase of ENERGY STAR® computer equipment also continues throughout all DOL agencies.

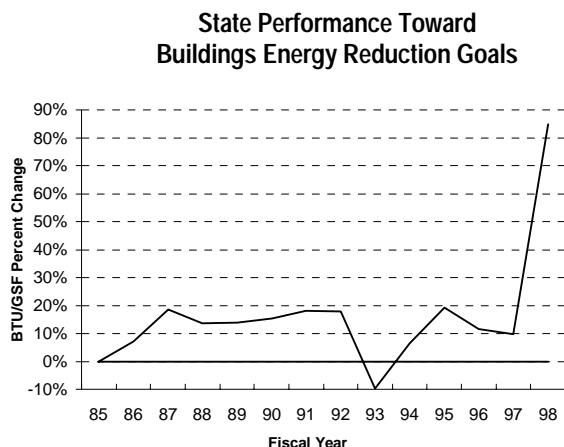
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10. DEPARTMENT OF STATE (ST)

Energy Efficiency Performance and Implementation Strategies

In FY 1998, the Department of State reported energy consumption in all overseas facilities, which was excluded in previous years. The apparent increase in buildings Btu/GSF of 84.9 percent is caused by the non-reporting of this data in FY 1985.



State Buildings Energy Use and Costs, FY98

	BBtu	\$ (Thou.)
Electricity	4,758.9	40,991.9
Fuel Oil	1,498.0	4,210.0
Natural Gas	1,113.0	1,875.1
Purchased Steam	52.0	920.0
Total	7,422.7	47,997.0

In FY 1998, the State Department conducted two comprehensive survey/audits. One of these was technology-specific. Each manager has developed an energy plan to complete energy conservation opportunities identified.

Energy conservation projects were accomplished in seven buildings, with most focusing on lighting upgrades to T-8 fluorescent tubes, reflectors and ballasts, and replacement and/or upgrades to motors using energy-efficient alternatives. Weatherization, roofing, HVAC controls, and better maintenance schedules for more optimum energy-efficient operation have also been accomplished.

Three other properties have been surveyed for energy conservation opportunities, identifying upgrades to basic lighting and humidification equipment, and pumps and motors. All remaining buildings will be reviewed within the next 2 years.

During FY 1998, the Office of Foreign Buildings Operations (FBO) devised a means for assessing energy conservation progress in all overseas buildings, without creating an unmanageable administrative burden. The result uses fiscal data already collected annually by the regional bureaus, FBO's computerized property inventory, and a small selection of utility bills which FBO will request from each post annually.

Between 1991 and 1997, FBO estimates that annual energy use per square foot of overseas facilities declined by approximately 16.7 percent.

In FY 1998, comprehensive surveys were performed for State Department properties at the following U.S. Embassies:

- Antananarivo, Madagascar;
- Brussels, Belgium;
- Dar Es Salaam, Tanzania;
- Helsinki, Finland;
- Jakarta, Malaysia;
- Monrovia, Liberia;
- Paris, France;
- Santo Domingo, Dominican Republic;
- Hong Kong; and
- Prague, Czech Republic,

Comprehensive surveys were also performed at the following Consulate Generals:

- Fukuoka, Japan;
- Osaka-Kobe, Japan;
- Naha, Japan; and
- Sapporo, Japan

By the end of FY 1998, 18 energy conservation projects resulting from these surveys were initiated. Approximately 44 percent of the total available space in the State Department's worldwide facility inventory has been surveyed to date.

Overseas posts with solar hot water projects under way include residences in:

- Dar Es Salaam, Tanzania;
- Gaborone, Botswana;
- Port Louis, Mauritius;
- Windhoek, Namibia;
- Chennai, India;
- Mumbai, India;
- New Dehli, India,
- Tegucigalpa, Honduras; and,
- Dakar, Senegal.

The design for a new office building in Tashkent, Uzbekistan includes passive solar exterior shading features to control solar gain.

FBO anticipates replacing about half the State Department's worldwide office building inventory in the next ten years. Future major new construction projects will comply with the EPA/DOE ENERGY STAR® Building requirements.

State was the first Government agency to enter into a Memorandum of Understanding with the Geothermal Ground Source Heat Pump Consortium (GeoExchange). The ultimate objective is to facilitate installations of GeoExchange technology in any and all buildings where it is determined to be feasible and most cost-effective among energy-efficient technologies.

The State Department's first attempt to install Geothermal heat pump technology during the summer of 1998 at the Charleston Regional Center, South Carolina, looked promising. Unfortunately, total economic costs, the need for a hybrid system, and building design prevented implementation of this project.

Energy Showcases

The State Department has selected the National Foreign Affairs Training Center in Arlington, Virginia as its showcase facility. State is also applying for FY 2000 showcase designation for the Main State Building, due to the award-winning Electronic Relamping Project.

Designs were initiated or ongoing in FY 1998 for new office buildings in Tashkent and Berlin, Germany, and for housing in Shanghai, China, which are designated showcases.

Training

The State Department continues to have building management personnel trained through Association of Energy Engineers and FEMP curriculum courses.

Funding

Funding requests for energy conservation opportunities and capital equipment replacement are included in building management's normal budget submission. Projects are prioritized by their nature. Consideration is given to life-cycle cost effectiveness, condition of equipment, and savings-to-investment ratios.

In FY 1998, FBO obligated \$3,181,781 to overseas posts for implementation of a total of 396 conservation measures, which are expected to yield annual energy savings of approximately \$760,956.

Energy Savings Performance Contracts

The State Department has two ongoing, nearly completed energy savings performance contracts (ESPCs) at the Main State Building in Washington, DC, and the Beltsville Information Management Center (BIMC) in Beltsville, Maryland. Additional projects planned for the BIMC in FY 1999 include the installation of electronic drives for multiple pumping units. Also, a cross connection between the two chilled water systems will increase energy efficiency. A geothermal heat pump system will be considered when the old building chiller is scheduled for replacement in FY 2000.

The State Department awarded its first overseas ESPC in July 1998 to upgrade lighting and HVAC controls in Mexico City, Mexico. This project has a contract value of \$593,557 and a contract term of nine years, with expected annual savings of \$67,000. Cumulative savings over the contract term will amount to \$603,000 and 6.6 million kilowatt-hours.

Another ESPC is being negotiated for the installation of a natural gas fuel cell power plant at the Carl Schurz Siedlung residential complex in Frankfurt, Germany, during 1999. Other ESPC initiatives under consideration for FY 1999 and FY 2000 include projects in:

- New Dehli and Mumbai, India;
- Tokyo, Japan; and,
- Santo Domingo, Dominican Republic.

The State Department intends to set up worldwide or regional ESPCs through Basic Ordering Agreements. Implementing ESPCs should become faster and easier once these regional hubs are in place.

An ESPC procurement is planned for the National Foreign Affairs Training Center, that will include renewable energy technology if practicable, and possibly a new lighting technology incorporating a microwave energy source.

Utility Partnerships

The State Department's first potential energy savings agreement (ESA) contract originated from GSA's Chiller Replacement Program in the Washington Metro Area. The Main State Building is scheduled for a total modernization by GSA with construction on Phase 1A1, the building HVAC plant, in FY 2000. Potomac Electric Power Company (PEPCO) sought the opportunity to bid on the project in advance of the scheduled renovation.

The scope of the project included replacement of the building chillers and associated pumps and motors of the HVAC plant, an energy management and control system, replacement of the steam station and associated valves, and replacement of the cooling tower with a winterized cell tower. Unfortunately, the project was shelved due to an excessive life-cycle cost of 27.1 years.

Vehicles

In addition to a 90 percent alternative-fuel vehicle, compressed natural gas (AFV-CNG) auto acquisition plan, the State Department has embarked upon an ambitious AFV-CNG shuttle bus fleet acquisition plan. State purchased its first CNG coach from Bluebird, Inc., through GSA. State plans to have an entire AFV-CNG shuttle bus fleet by 2002, completely phasing out all diesel use.

Environmental Activities

The State Department is scheduled to have non-CFC refrigeration units installed by GSA in FY 1999 and FY 2000 in conjunction with the first phase of the Main State Building's modernization.

The State Department has one of the most successful recycling programs in the Washington Metro area. The Department recycles paper, cardboard, glass, aluminum and steel cans, construction debris, toner cartridges, light ballasts, fluorescent tubes, oils, solvents, and paints.

State takes advantage of DOE's Buying Energy-Efficient Products program (BEEP). Building managers in each domestic facility support the ^E_E segment of the program and procure new energy-efficient products.

The State Department will continue to submit deserving cases to DOE for consideration in the annual Federal Energy Efficiency Awards program.

In February 1998, the State Department issued two worldwide telegrams emphasizing energy conservation and opportunities for awards. FBO regularly publishes articles on energy conservation in the *Maintenance Matters* newsletter, which is distributed to posts worldwide.

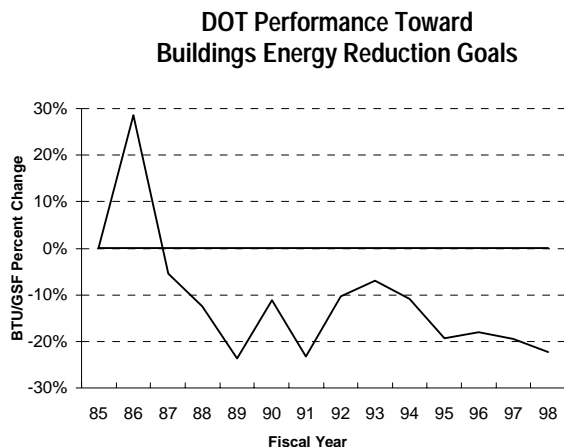
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11. DEPARTMENT OF TRANSPORTATION (DOT)

Energy Efficiency Performance and Implementation Strategies

During FY 1998, the Department of Transportation reported a 22.3 percent reduction in buildings consumption in Btu per gross square foot compared to FY 1985.



DOT Buildings Energy Use and Costs, FY98

	BBtu	\$ (Thou.)
Electricity	2,031.0	43,023.3
Fuel Oil	782.0	4,223.2
Natural Gas	806.6	5,006.8
Propane	34.8	339.5
Purchased Steam	13.4	181.6
Total	3,667.9	52,774.4

The seven operating administrations (OAs) that operate facilities and the Transportation Administrative Service Center (TASC) all have active energy and water efficiency programs. In FY 1995, each OA developed an audit plan based on a prioritization review. These 10-year audit plans were consolidated by the Office of the Secretary into a master audit plan. The OAs are now working with this plan.

Some notable energy surveys and energy conservation measures were completed in FY 1998, including:

- The Federal Aviation Administration (FAA) completed 18 audits. Approximately 68 energy conservation measures (ECMs) were investigated for cost and payback period. Total ECM backlog is currently about \$6 million. Lighting upgrades and air conditioning chiller upgrades are the most frequently occurring ECMs noted during energy

audits. The FAA also conducted reviews of its utility bills and uncovered more than \$550,000 in overcharges and billing errors.

- The Federal Highways Administration (FHWA) continued its \$6.5 million renovation of the Fairbanks Building in McLean, Virginia. Renovations include a new variable air volume HVAC system, new low-pressure boilers, efficient lighting, new windows and doors, and roof insulation.
- The Maritime Administration (MARAD) has continued to make efficiency improvements at the Merchant Marine Academy (MMA) in King's Point, New York. New roofs, doors, and windows were installed in several buildings.
- The U.S. Coast Guard (USCG) completed SAVEnergy audits at many of its facilities. Audits have been completed at eight major facilities representing approximately 62 percent of USCG space. These audits identified more than \$12 million in projects that, when implemented, would save around \$3 million annually. USCG currently has a \$3.5 million project backlog.

Operation and maintenance (O&M) procedures are decentralized within DOT. Basic procedures at facilities include securing HVAC equipment, unnecessary lighting, and office equipment during unoccupied hours. The FAA reduced airport and runway lighting when it did not compromise safety of aircraft operations. Normally, O&M improvements are implemented without delay if the cost is \$5,000 or less. The use of energy management systems, such as the one installed at the Mike Monroney Aeronautical Center (MMAC) in Oklahoma City, Oklahoma, also help reduce consumption and demand.

USCG is continuing efforts to secure approval for a 280-unit solar hot water project for residential units in Hawaii. Financial and technical support for this effort is being provided by DOE and the National Renewable Energy Laboratory.

FAA's Southwest Region installed photovoltaic power panels at 16 remote communications locations during FY 1998, and additional installations are planned for FY 1999.

Energy Showcases

USCG is actively engaged in the development of eight ENERGY STAR® buildings that will become showcase buildings once projects have been completed. Energy improvements made in the DOT headquarters building (designated a showcase in 1995) help avoid \$1 million in costs annually.

Training

USCG conducted an energy training workshop in Milwaukee, Wisconsin, in March 1998 that was attended by 50 facility engineers. The workshop included an overview of the USCG facilities energy program and a formal training session on direct digital controls. Twenty-eight USCG and approximately 10 FAA personnel attended the FEMP Energy '98 conference in Bellevue, Washington, and several USCG and FAA staff made presentations. Thirty-seven FAA employees received training on FAA's revised Energy Management Reporting System.

Funding

DOT has had to leverage funding to accomplish surveys and audits. The USCG and FAA have both used the DOE FEMP SAVEnergy program and utility company incentive programs, as well as in-house staff to perform surveys.

Energy Savings Performance Contracts

Four energy savings performance contracts (ESPCs) were awarded during FY 1998:

- The Research and Special Programs Administration awarded an ESPC to install an energy management system and new lighting at its Cambridge, Massachusetts, research facility.
- USCG awarded an ESPC delivery order in Kodiak, Alaska, under the DOE Western region Super ESPC.
- FAA also awarded an ESPC delivery order for a lighting retrofit at its Seattle, Washington, Air Route Traffic Control Center.
- USCG awarded an ESPC for energy improvements at the USCG Academy through the Corps of Engineers in Huntsville, Alabama.

USCG has offered its Air Station Cape Cod and Support Center Elizabeth City as pilot ESPC sites for the development of DOE's Northeastern and Mid-Atlantic Super ESPCs. FAA's MMAC has prepared a Request for Proposal for various air handlers and control improvements, but these have been placed on hold by the contracting officer.

There is minimal current monetary savings from these ESPCs because most of the savings are paid to the contractor to shorten the term of the contracts. Annual cost savings after the term of the contract will be in excess of \$650,000, and annual energy savings from the four contracts is estimated at 54,000 MMBtu. As savings are realized from ESPCs they will be reinvested in new energy projects.

Utility Partnerships

FAA's MMAC has entered into a third-party natural gas purchase contract that has resulted in saving \$138,000 for the initial contract period.

Environmental Activities

The Assistant Secretary for Administration signed the Energy Efficiency and Resource Conservation Challenge. FAA has provided each of its energy managers, purchasing agents, and contracting officers with the DOE FEMP publication *Buying Energy Efficient Products*.

Each personnel office and OA primary energy manager has been advised of the requirement for energy and water efficiency being included in performance evaluations. FAA has established an energy and water conservation category within their Environmental Excellence Award Program. USCG has developed a similar incentive program. The OAs are also strongly encouraged to nominate employees for the annual Federal Energy and Water Management Awards.

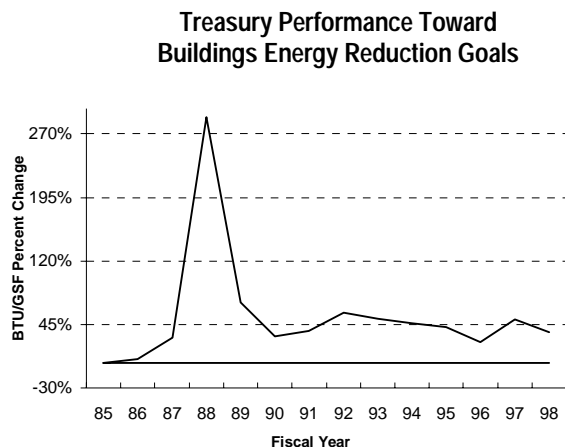
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12. DEPARTMENT OF THE TREASURY (TRSY)

Energy Efficiency Performance and Implementation Strategies

During FY 1998, the Department of the Treasury reported a 36.1 percent increase in buildings consumption in Btu per gross square foot compared to FY 1985.



Treasury Buildings Energy Use and Costs, FY98

	BBtu	\$(Thou.)
Electricity	1,162.9	23,896.6
Fuel Oil	41.4	170.9
Natural Gas	478.5	1,874.9
Propane	3.4	27.9
Purchased Steam	55.0	823.7
Total	1,741.2	26,794.0

The Treasury Department's energy management program is implemented at the Bureau level. Treasury is committed to meeting the 30 percent reduction goal at non-industrial facilities by 2005. However, over the next two years, the Bureau of the Mint will have a significant increase (23 percent) in energy consumption due to the Commemorative Quarter Program.

The following are energy and water saving projects performed during FY 1998:

- The Internal Revenue Service's (IRS) Andover Service Center continued its upgrade program with their three chillers being interconnected allowing for better load management, saving approximately \$50,000 and 600 megawatt-hours annually. A Unisys mainframe and related air conditioning was

also removed for a 1,700 megawatt-hour and \$175,000 annual savings.

- GSA has initiated a major renovation of the IRS Headquarters in Washington, DC. This includes chiller, motor, and lighting replacement expected to result in \$192,000 in annual savings.
- The Cincinnati Service Center installed a new UPS system which will decrease the cooling load by 80 tons.
- The Financial Management Services (FMS) installed automatic valves on faucets and urinals in the Liberty Loan Building. FMS is also working with GSA and PEPCO to develop a building-wide lighting upgrade. At the Birmingham, Alabama Regional Financial Center GSA completed a major renovation including lighting, building envelope, and HVAC upgrades.
- The Federal Law Enforcement Training Center (FLETC) in Glynco, Georgia completed renovation of an 80,000 square-foot dormitory, including lighting, insulation, window, and HVAC upgrades.

Training

Treasury makes significant use of training courses offered by DOE. During FY 1998, Treasury sent 11 employees to energy management training courses at a cost of \$36,500. DOE FEMP courses were used whenever possible due to their low cost and high quality.

Funding

Overall, Treasury bureaus spent \$328,000 to install energy and water conservation measures during FY 1998. This figure does not reflect GSA's expenditures in buildings delegated to Treasury. Anticipated savings from the FY 1998 investments total \$114,000 per year.

The bureaus plan to spend \$1.8 million in FY 1999. The bulk of this spending will be at the Main Treasury building, IRS, and Mint facilities.

Energy Savings Performance Contracts

Treasury bureaus implemented their first two energy savings performance contracts (ESPCs) in FY 1997.

In FY 1998, the Bureau of the Mint implemented two ESPCs at the Denver, Colorado and San Francisco,

California Mints. The contracts totaling \$1.688 million will install energy efficiency measures including lighting retrofits, chiller replacements, HVAC upgrades, and upgrading the compressed air system. Anticipated annual savings are \$192,300 and 1,474 megawatt-hours. Additionally, the San Francisco project will save more than 1 million gallons of water annually. Installation will be completed early in FY 1999.

The U.S. Secret Service has proposed a second ESPC for their Beltsville, Maryland training facility. The ESPC with Baltimore Gas and Electric will cover a lighting retrofit in all buildings and day lighting in five buildings. Annual savings are expected to total \$100,000.

The Bureau of Engraving and Printing is discussing possible development of an ESPC with PEPCO. The U.S. Customs Service has also identified nine large residential units for possible use of ESPCs.

Utility Partnerships

The IRS's Andover Service Center entered into GSA's area-wide contract in accordance with the deregulation of utilities in Massachusetts. This will save \$100,000 per year.

FLETC, working with GSA, negotiated a new utility contract with Georgia Power. The new plan reduces the number of meters read by the utility from 124 to 5. FLETC bought out the old meters for \$361,000 and expects the new rate structure to deliver annual savings of \$460,000 from reduced demand charges.

Vehicles

The bureaus have implemented driver awareness programs aimed at getting employees to drive in the most fuel-efficient manner possible. Bureaus continue to eliminate vehicles whenever possible, and request the smallest class of vehicle which will still accommodate the mission.

Treasury is developing a telecommuting policy which will allow for work from home, at satellite facilities, and hotels.

Treasury continues to slowly expand its alternative fueled vehicle fleet. The Bureau of Alcohol, Tobacco, and Firearms has reached 9 percent of its covered fleet acquisitions. Most of the treasury fleet is exempt from this requirement due to its law enforcement mission.

Environmental Activities

Treasury is committed to purchasing products in the top 25 percent of energy efficiency. Copies of the DOE "Energy Efficient Product Guide" have been provided to energy management and procurement personnel. All computers, monitors, printers and copiers purchased are ENERGY STAR® compliant.

CFCs removed from old equipment are recovered and turned over to the Defense Logistic Agency CFC bank. Several Bureaus are now specifying the new low mercury lamps in all purchases, thereby reducing the amount of hazardous waste generated at their facilities.

Energy Management Contact

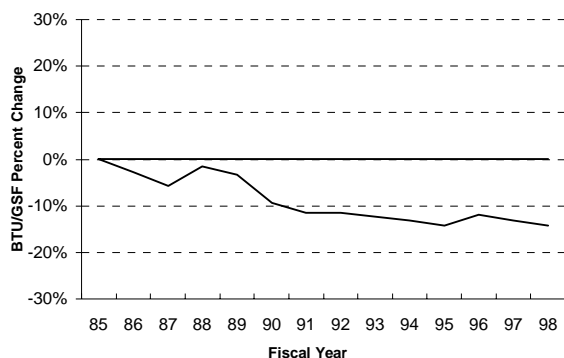
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13. DEPARTMENT OF VETERANS AFFAIRS (VA)

Energy Efficiency Performance and Implementation Strategies

During FY 1998, the Department of Veterans Affairs reported a 14.2 percent reduction in buildings consumption in Btu per gross square foot compared to FY 1985.

VA Performance Toward Buildings Energy Reduction Goals



VA Buildings Energy Use and Costs, FY98

	BBtu	\$ (Thou.)
Electricity	9,258.0	164,516.4
Fuel Oil	950.9	3,831.5
Natural Gas	14,502.2	52,031.2
Propane	3.6	28.9
Coal	147.1	149.6
Purchased Steam	1,193.0	9,723.6
Other	162.0	638.7
Total	26,216.9	230,919.9

In order to meet the requirements of NECPA, EPACK, and Executive Order 12902, the Department of Veterans Affairs developed a 13-year plan for FY 1993 to FY 2005.

Building retrofit projects underway at VA facilities include the installation of state-of-the-art energy management control systems, modifications of existing HVAC systems, steam trap replacement, improvement of boilers and power systems, retrofitting lighting fixtures, installation of additional insulation and storm windows, and water conservation projects.

Training

During FY 1998, many medical centers took advantage of training classes offered by the Association of Energy Engineers in cooperation with DOE.

Funding

VA's funding for energy conservation retrofits and capital improvements was approximately \$11.7 million for FY 1998. Plans call for funding cost effective projects that have been approved by Veterans Integrated Service Network (VISN) Directors for accomplishment at the medical centers for FY 1999.

Energy Savings Performance Contracts

Since its first experience with energy savings performance contracts (ESPCs) in 1993, VA has issued a Final Boilerplate to all VA medical centers. The following projects were completed in FY 1997:

- VA Medical Center, Lake City, Florida, completed the retrofit of lighting fixtures throughout the facility;
- VA Medical Center, Dallas, Texas, installed a thermal water storage systems;
- VA Medical Center, Richmond, Virginia completed the installation of cooling towers; and
- VA Medical Center, Portland, Oregon, retrofitted approximately 10,000 lighting fixtures, 500 exit signs, and 800 occupancy sensors.

In 1998, almost all VISNs considered the possibility of using ESPCs and are planning to sign or have already signed a Memorandum of Agreement either with the U.S. Army Engineering and Support Center, Huntsville, Alabama, or DOE for the various services they offer under their ESPC programs. The following facilities have progressed in implementation efforts and have decided the ESPC method they are planning to use:

- Station-level contracts: 18 facilities
- DOE-based contracts: 16 facilities
- DOD-based contracts: 36 facilities
- GSA areawide-based contracts: 9 facilities

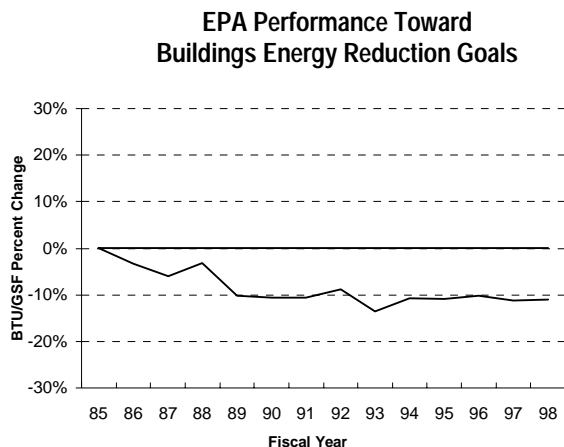
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14. ENVIRONMENTAL PROTECTION AGENCY (EPA)

Energy Efficiency Performance and Implementation Strategies

In FY 1998, the Environmental Protection Agency reported a decrease in buildings energy of 11.0 percent in Btu per gross square foot compared to FY 1985.



EPA Buildings Energy Use and Costs, FY98

	BBtu	\$(Thou.)
Electricity	434.6	6,799.3
Fuel Oil	9.1	41.4
Natural Gas	533.5	2,223.6
Propane	0.6	8.1
Purchased Steam	45.2	417.0
Total	1,022.9	9,489.4

The main objective of EPA's Energy and Water Conservation Program is to effectively and efficiently use natural resources when designing, constructing, and maintaining EPA facilities and facility systems.

While implementing its energy program, EPA has learned that its largest energy conservation opportunity is within the HVAC system of its laboratories. Due to energy-intensive health and safety requirements for one-pass air for a laboratory, EPA's energy consumption is extraordinarily high. To address this, EPA is aggressively pursuing energy-efficient upgrades at several of its laboratories.

Descriptions of projects worked on during FY 1998 follow:

- Duluth, Minnesota. An energy management and control system has been installed. Two large boilers will be replaced with 10 smaller boilers to improve load efficiency.
- Gulf Breeze, Florida. A contract has been awarded to install Nodal Direct Digital Controls which will minimize energy waste, and monitor building security, fire protection, and indoor environmental quality. Timers were installed on approximately 20 electric water heaters.
- Edison, New Jersey. A combination desiccant wheel/heat transfer wheel system has been installed as a pilot program to recover energy from fume hood exhausts and to control humidity and conditioning in analytical chemistry laboratory modules.
- Houston, Texas. The air system was modified and an existing DDC system was upgraded. The facility incorporated a cooling tower condensate return system to reduce water consumption and operating costs, and enhance environmental conditions. The use of a night setback system is being incorporated to control exhaust fans, laboratory fume hoods, and supply air.
- Cincinnati, Ohio. Projects included a closed loop glycol cooling tower, energy-efficient electric chillers, energy-efficient elevator motors, boiler controls, building envelope modifications, adding a new HVAC system, Green Lights, and a new energy-efficient boiler.
- Ann Arbor, Michigan. In addition to the ESPC discussed below, NVFEL installed a photovoltaic energized active daylighting system to provide natural lighting in a hi-bay area. NVFEL's energy conservation efforts in FY 1998 saved \$45,000 in utility bill costs, which the facility used to purchase two pieces of equipment. The first, a \$32,000 vehicle mover allows an operator to maneuver test vehicles without starting their engines. The second was a \$13,000 fuel flow measurement system.
- New EPA Headquarters, Washington, DC. Many energy-efficient HVAC and lighting features have been incorporated into the design of the new headquarters. These include space-adjustable thermostat-controlled variable air volume fans, an

upgraded HVAC system, and high-efficiency lighting controlled by workspace and floor motion sensors.

EPA recognizes that renewable energy sources and technologies are the most environmentally beneficial method of reducing facility energy consumption. EPA is including a requirement that renewable technologies be installed as part of facility upgrades in all ESPCs. Renewable opportunities include:

- Ft. Meade, Maryland. EPA, DOE and DOD have assembled a public-private partnership to potentially demonstrate the world's first megawatt class solid oxide fuel cell power station at EPA's new Fort Meade Environmental Science Center. Westinghouse Corporation, Baltimore Gas and Electric, and the Electric Power Research Institute are also involved.
- Athens, Georgia. A biomass feasibility study has been completed with the help of DOE, Tennessee Valley Authority, USDA, University of Georgia, and Georgia State Forestry. Preliminary results indicate biofuel could be obtained from materials currently disposed of in landfills. The next project phase will determine what equipment is suited to the Athens laboratory. Also, a solar hot water heater was installed at the on-site day care center.
- Gulf Breeze, Florida. EPA and the National Renewable Energy Laboratory (NREL) have jointly funded and awarded a photovoltaic system to generate on-site electricity to light the facility's piers.
- Edison, New Jersey. Three solar hot water heating systems are now the primary source of hot water in their respective facility areas. So far, this technology has resulted in savings significantly higher than expected.
- Manchester, Washington. EPA and NREL have jointly funded a demonstration photovoltaic project.
- Golden, Colorado. EPA and NREL are considering various solar technologies for a newly constructed leased facility.

Training

EPA participated in, and hosted numerous training events during FY 1998. Program staff regularly at-

tended energy and water conservation conferences, seminars, and working groups. Engineers, architects, and facility management were encouraged to use proven innovative technologies. Contract staff who are certified trained energy managers briefed program staff periodically throughout the year on innovative technologies and design.

EPA's Office of Administration (OA) has instituted a semi-annual conference entitled "Laboratories for the 21st Century" for agencies pursuing energy upgrades in Federal laboratories. EPA and DOE partnered in this effort. The first conference was held at the American Institute of Architects headquarters in Washington, DC in September 1997 and the second was held at Lawrence Berkeley National Laboratory (LBNL) in San Francisco, California in May 1998.

A third conference is scheduled for September 1999 in Cambridge, Massachusetts, and will be open to both Federal and non-Federal participants.

Energy Savings Performance Contracts

An ESPC to conduct a complete energy upgrade at the National Vehicle and Fuel Emissions Laboratory (NVFEL) in Ann Arbor, Michigan was awarded in Spring of FY 1998. Source emissions, energy consumption, and energy costs will all be reduced, renewable energy technologies will be installed, all while preserving the integrity of the laboratory's mission. The project will reduce NVFEL's energy consumption by 66 percent, lower energy costs by 74 percent, and reduce water consumption by 80 percent.

Based on the success of the NVFEL project, several other facilities have been targeted for upgrades using ESPCs and DOE's Super ESPCs:

- Ada, Oklahoma. The laboratory will undergo a comprehensive energy-efficiency upgrade of its chiller and boiler systems. A ground-source heat pump system will be installed, along with an integrated DDC system for energy, fire, and security management.
- Manchester, Washington. This facility is in the planning stage to be upgraded through DOE's Western Region Super ESPC. Contract award is expected during FY 1999.
- Duluth, Minnesota. This facility is in the planning stage to be upgraded using an ESPC during FY 1999. Geothermal heat pumps, wind turbines, and

photovoltaics are among the technologies being investigated.

- Gulf Breeze, Florida. This facility is in the planning stage to be upgraded using DOE's Southeast Region Super ESPC. EPA has negotiated an Inter-agency Agreement with DOE to provide a no-cost energy audit, in order to create the energy baseline model.
- Narragansett, Rhode Island. EPA is designing a HVAC system upgrade using high-efficiency chillers, geothermal heat pumps, and latent energy recovery technologies. This project will use the readily available heating and cooling potential of circulated bay water used for salt-water aquatic testing in the laboratory. The project will be pursued through DOE's Northeast Region Super ESPC. The request for proposals will require renewables.
- Las Vegas, Nevada. This facility is being reviewed for upgrade through an ESPC project.
- Richmond, California. This facility is in the planning stage for upgrade through DOE's Western Region Super ESPC. EPA is working with DOE, the NREL, LBNL, and the building owner to establish this as the first Federal leased facility ESPC.
- Athens, Georgia. This facility expects to utilize ESPCs for energy upgrades starting in FY 2000.

Environmental Activities

EPA has developed personnel performance standards to rate staff efforts toward achieving energy and water conservation program objectives—outstanding, satisfactory, and unsatisfactory. Implementation of these standards helps ensure that personnel will consider energy-efficient opportunities.

OA has a steering committee to organize EPA's integrated pollution prevention management program, that includes EPA energy and water conservation efforts.

EPA is committed to purchasing best-practice energy-efficient and water-saving products that are in the upper 25 percent of all products in that category. EPA is also committed to purchasing emerging technologies and products that offer greater energy-efficiency, water savings, or use of renewable resources than products now commercially available.

EPA is committed to accelerating the acceptance of cleaner power alternatives and has established a pilot project at its Richmond, California facility. Once the project is complete, the EPA laboratory will run completely on green power. An aim of the project is to develop a procurement strategy for the purchase of green power that can be used as a prototype for other projects across the country. EPA will be the first government entity to implement the use of green power at one of its facilities.

EPA also plans to implement green power purchasing at its Athens, Georgia and Narragansett, Rhode Island facilities.

A series of energy awareness posters have been developed, illustrating energy-efficient HVAC systems, ESPCs, and pollution prevention. These posters are displayed at all EPA functions.

Through DOE's "You Have the Power" campaign, EPA identified and awarded 13 EPA employees as energy champions. Promotional materials were developed, including energy champion posters highlighting the EPA employees and their work; "Hometown Hero" newspaper articles describing their efforts; a large "You Have the Power" banner displayed at EPA headquarters for a month beginning on Earth Day, 1998; and an industry partnership advertisement issued in September 1998.

EPA continues to produce and distribute its quarterly newspaper, *Greening EPA*, formerly *Conservation News*. Articles in this newspaper provide the basis for facility managers to implement campaigns to conserve energy and at the same time inform the general public about EPA-specific conservation activities. EPA's Web site also offers a great opportunity to spread the energy and water conservation word, and includes the latest issue of *Greening EPA*.

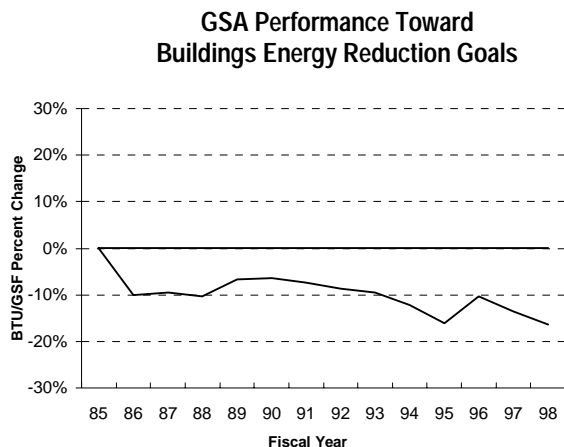
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15. GENERAL SERVICES ADMINISTRATION (GSA)

Energy Efficiency Performance and Implementation Strategies

In FY 1998, GSA reported a 16.4 percent decrease in energy consumed in owned and leased buildings compared to FY 1985 in Btu per gross square foot.



GSA Buildings Energy Use and Costs, FY98

	BBtu	\$ (Thou.)
Electricity	8,684.2	183,995.0
Fuel Oil	54.8	236.4
Natural Gas	3,086.7	14,897.9
Purchased Steam	1,298.0	19,947.0
Total	13,123.7	219,076.3

GSA has had an energy reduction plan since 1991. The plan was updated in 1998, which coincided with GSA's creation of an Energy Center Of Expertise and reflects the new approved business plan. The National Energy Center will reduce utility costs by promoting optimal energy use while protecting the environment and ensuring a quality workspace for GSA clients.

The Energy Center will have approximately 25 staff, plus regional associates. There are five people in Kansas City, Missouri; seven in the Public Utilities Center in Washington, DC; seven in the National Energy and Water Management Center in Fort Worth, Texas; and one or two regional associates in each of GSA's 11 regions.

The National Energy Center has several objectives:

- Optimize utility management and life-cycle costs and enhance building operations efficiency;

- Establish GSA as the Government's provider of choice for utility commodities and services;
- Encourage advocacy and partnering; and
- Provide leadership and promote energy efficiency and renewable energy.

In order to respond to the needs of Federal agencies, the Energy Center provides:

- Areawide contracts for the procurement of utilities and for acquisition of value-added services, such as utility financing of energy conservation projects;
- Aggregate purchasing of natural gas and electricity in deregulated markets;
- Energy use and analysis data; and
- Advocacy in the public policy arena to include renewable power sources as part of our energy portfolio.

Energy surveys are performed in accordance with GSA's 10-year audit plan. Some are obtained at no cost from utilities, some are obtained through DOE's SAVEnergy audit program, and the rest are funded by GSA. Audits identify energy conservation opportunities, which are developed into energy conservation project proposals using life-cycle costing methodology. Project submissions are compiled into a database for ranking by savings-to-investment ratio.

GSA conducted approximately 78 audits during the year. As funding permits, GSA will implement all life-cycle cost-effective projects with a payback of 10 years or less.

GSA is currently testing ASHRAE's BACnet standard, an open communication protocol for building automated controls. These efforts will result in increased energy efficiency.

GSA did not deploy any renewable technologies during FY 1998, but has several projects scheduled for completion:

- A 2-kilowatt photovoltaic unit on top of a security guard shack in Kansas City, Missouri;
- Multiple solar units in Boston, Massachusetts; and
- 32 hot water solar units measuring 40 square feet each on the Prince Kuhio Federal Building in Honolulu, Hawaii.

Environmental Showcases

In FY 1998, DOE provided the showcase facilities award to four GSA buildings:

- Hawthorne Federal Building, Hawthorne, California;
- Chet Holyfield Federal Building, Laguna Niguel, California;
- Tampa Federal Courthouse II, Tampa, Florida; and
- Alexander Hamilton Customs House, New York, New York.

For new construction in FY 1999, GSA expects to formally announce at least one showcase facility, the EPA regional headquarters building in Kansas City, Kansas.

Training

In FY 1998, GSA held seven workshops in partnership with Federal agencies and state governments. These included:

- An energy conservation, deregulation, and alternative financing workshop in New York, New York;
- An energy conservation, deregulation, and energy product trade show in Seattle, Washington;
- A fleet vehicle energy conservation workshop in Scottsdale, Arizona;
- An energy efficiency products/services workshop in Washington, DC;
- A CoolSense workshop in Kansas City, Kansas;
- An intertribal utility purchasing/aggregation workshop in Rapid City, South Dakota; and
- A utility aggregation workshop in Tampa, Florida.

GSA continues to train its own personnel in all aspects of energy and water management and conservation. GSA currently has 28 trained energy managers on staff. Routine training includes topics like industrial energy process and building analysis, ASHRAE 90.1, energy management techniques, and building life-cycle costing.

Funding

In FY 1998, there were no appropriations. This trend in underinvesting may result in GSA not meeting the energy reduction goals. GSA does not have any energy efficiency or water conservation projects under way in FY 1998 from specific appropriations. Due to severe budget limitations in the Federal buildings fund, GSA did not request such appropriations.

Energy Savings Performance Contracts

GSA's Regional Energy Coordinators identify energy conservation opportunities and ESPC opportunities. The Energy Center coordinates congressional notification, provides guidance and information of best practices, and promotes the use of ESPCs.

Two ESPCs are currently in place. In FY 1997, GSA awarded a \$1.6 million ESPC for new construction at the DeConcini Courthouse and Federal Building in Tucson, New Mexico. Also awarded was a chiller replacement ESPC at the Burton Federal Building in San Francisco, California, which will generate annual savings of \$287,000 and 5.0 billion Btu.

GSA anticipates using the DOE Super ESPCs as they become available in all 11 regions and when situations present this option as the best business decision among available financing options.

Utility Partnerships

In 1998, GSA used areawide utility contracts and basic ordering agreements to obtain utility financing of energy projects.

In Vermont, GSA awarded four utility-financed projects at U.S. Border Station facilities. These projects were small in scope, consisting of lighting retrofits. Total project costs were \$4,872, with expected annual savings of \$3,735 and 153.7million Btu.

In GSA Region 4, a \$200,726 lighting retrofit was financed through the GSA areawide utility contract. Annual savings are \$34,655 and 1.9 billion Btu.

Environmental Activities

In FY 1998, GSA launched a new environmental concept called Planet GSA, which calls attention to four key areas in which GSA already plays a significant role:

- **Buying Green.** GSA manages a recycling program for 643,000 Federal employees in 1,000 Federal buildings. GSA's procurement process is going paperless. GSA's Environmental Products Guide carries more than 3,000 products and services that are environmentally orientated.
- **Building Green.** GSA will implement sustainable design principles in designing, constructing, modernizing, and disposing of their buildings. In FY 1998, GSA funded experts to design the Denver Courthouse project to serve as a model for the sustainable building program.
- **Driving Green.** GSA has bought 18,500 alternative fuel vehicles (AFVs) for the nationwide Federal fleet. The Energy Policy Act of 1992 requires that within the largest cities in 1998, 50 percent of all new vehicles must use alternative fuel. In 1999, this is up to 75 percent. To help, GSA has waived lengthy justifications to upgrade from a compact sedan to a midsize AFV.
- **Saving Green.** GSA will follow the Energy Center of Expertise business plan that includes installing the most energy-efficient equipment to operate building systems. New lighting technologies and lighting-control strategies are being tested in New York and San Francisco; in Hawaii, GSA plans to use solar hot water heating; and in the Northeast, GSA has awarded a contract to provide "green" power for up to 5 percent of Federal needs.

The Foley Square Federal Building in New York City is the only Federal facility among 14 charter members in the ENERGY STAR® Buildings program of the EPA. Additionally, GSA completed a beta test of the ENERGY STAR® program and provided comments to EPA. GSA plans to use the program to determine the energy performance of its building inventory.

GSA continues to support procurement of energy-efficient products, and mandates the purchase of ENERGY STAR® computers and office equipment. GSA is a signatory to and an active participant in the Federal Procurement Challenge.

GSA annually participates in the DOE Federal Energy and Water Management Awards program and will receive four awards at the November 1998 ceremony. Also, GSA internally honors each one of the DOE award recipients with a ceremony and monetary award.

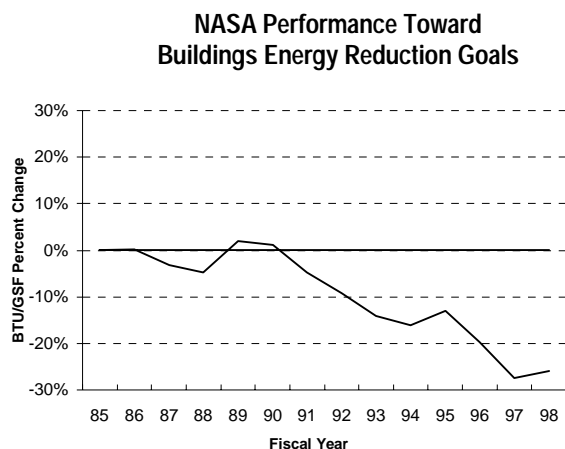
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16. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

Energy Efficiency Performance and Implementation Strategies

During FY 1998, the National Aeronautics and Space Administration reported a 26.0 percent reduction in buildings energy consumption in Btu per gross square foot compared to FY 1985.



NASA Buildings Energy Use and Costs, FY98

	BBtu	\$ (Thou.)
Electricity	2,542.3	37,280.0
Fuel Oil	83.6	359.0
Natural Gas	1,243.9	4,505.0
Propane	9.8	125.0
Purchased Steam	61.7	904.0
Total	3,941.4	43,173.0

NASA manages nine Centers, one Federally Funded Research and Development Center (FFRDC), and several Component Facilities and off-site program facilities from its Washington, DC, Headquarters.

NASA's mission-variable and industrial facilities, although exempt from NECPA requirements, are NASA's biggest energy consumers, representing more than 60 percent of total facility energy costs. For FY 1998, these facilities consumed 6,347.4 billion Btu, compared to 5,759.6 billion Btu in FY 1985. For this reason, NASA has established an internal goal to improve the energy efficiency of mission-variable buildings by 10 percent by FY 2000 compared to FY 1985 levels, where cost-effective and without adversely affecting mission performance.

During FY 1998, the following activities were undertaken at NASA facilities:

- Langley Research Center (LaRC) completed a major renovation of the National Transonic Facility that will significantly improve the operating efficiency of the facility, including installation of a new 135,000-horsepower variable-speed drive motor. Also, facilities serving the central compressed air utility system were consolidated, leading to the shutdown of the East Area Compressor Station.
- Through its Base Operations Support Services (BOSS) contract, Johnson Space Center (JSC) completed comprehensive energy and water conservation audits for all facilities at the main Center, Ellington Field, and the Sonny Carter Training Facility. JSC plans to implement the cost-effective energy and water conservation measures identified by the audits through ESPC contracts.
- Kennedy Space Center (KSC) completed a project to consolidate chilled water generation capacity. This project reduced energy consumption by replacing inefficient chillers that used CFCs with high-efficiency models and variable-speed chilled water pumping systems. Efficiency increased by 64 percent; energy savings attributed to this project are estimated at 21.8 billion Btu and \$320,000 per year. Maintenance expenses were also reduced by \$300,000 annually. KSC also completed 29 other energy projects totaling over \$1.5 million that will save \$599,000 annually.
- KSC continues to seek a reduction of overall potable water consumption. Efforts include installation of water saver kits for existing restroom flush valves and a biannual inspection of all main potable water distribution system components to verify proper operation and repair leaks. Cooling tower ozone treatment, which continues to produce water savings of 15 million gallons per year at the Launch Complex area and the Industrial Area Chiller Plant, has been supplemented with makeup water softening. This water conditioning measure will offset blowdown requirements, yielding an additional 16,000 gallons per day savings, or 5 million gallons per year.

- The NASA Industrial Plant at Palmdale, California, completed two projects in Building 150. The first replaced three inefficient CFC chillers with new chillers incorporating digital drives for energy conservation. The chilled water distribution system was also replaced with a primary/secondary chilled water system with variable-speed drives for each pump. The second project replaced 704 existing industrial fluorescent lighting fixtures with 155 energy-saving high-output, high-intensity-discharge metal halide fixtures. Together, these projects reduced annual energy costs by more than \$100,000.
- The Jet Propulsion Laboratory (JPL) continued its program to install waterless urinals throughout the Center. JPL also implemented two HVAC repair projects.
- Marshall Space Flight Center (MSFC) began construction of a multi-year \$21 million project to build a central chilled water facility. This will begin saving energy in FY 1999 and is expected to reduce energy and operations and maintenance costs by more than \$1.8 million annually.
- White Sands Test Facility (WSTF) installed low-flow urinals and lavatory fixtures in two administration facilities. Also started was the design and construction of evaporation ponds, which will displace approximately 1.2 million gallons of dilution water annually and save water pumping energy.
- Goddard Space Flight Center (GSFC) is using direct digital control (DDC) systems to turn off selected air handler motors between 7:00 PM and 5:00 AM on weekdays and all day on weekends. The air handlers run only if space temperatures rise above or fall below a given set point. This effort yielded GSFC's largest energy savings in non-mission variable buildings for FY 1998. GSFC also continued a multi-year project to replace its central chilled water distribution system. The second phase will be initiated in FY 1999. Also being replaced are GSFC's central steam and condensate systems, electric ovens and grills, and building curtain walls.
- Ames Research Center replaced about 1,000 incandescent bulbs with compact fluorescent lamps, saving 340,000 kilowatt-hours annually. Ames also replaced all on-site traffic signals with

LED units, saving 2,000 kilowatt-hours annually and virtually eliminating maintenance costs.

From FY 1991 through FY 1998, NASA completed energy audits for 70.2 percent of its total building square footage, including 72.4 percent of non-exempt square footage, and 67.9 percent of exempt and industrial square footage.

NASA, with the assistance of DOE's National Renewable Energy Laboratory (NREL), developed the Renewable Energy Technology Implementation Plan (RETIP), which identifies current renewable energy technology work under way at the Centers and organizes and coordinates the implementation of any potentially cost-effective projects at all NASA Centers and Component Facilities.

NASA continued its partnership with NREL to develop implementation guidelines for increasing NASA's use of renewable energy technology. The guidance will be issued as a new NASA directive in FY 1999, along with revised guidance for implementing energy efficiency and water conservation measures.

Several NASA Centers are using renewable energy technologies on selected small-scale applications:

- JSC is using photovoltaics to power traffic caution signals and the emergency warning system. Also being tested is a photovoltaic-powered direct expansion air conditioning system.
- WSTF installed a photovoltaic solar power source to provide energy to a microwave repeater site, providing a communication link to the U.S. Army's White Sands Missile Range.
- KSC is using photovoltaic exterior lighting systems in selected applications, including security lighting at the Merritt Island Launch Area. These lighting systems have been found to generate a lighting spectrum that is preferable to high pressure sodium lighting in areas near sea turtle habitat. The KSC security organization deployed five photovoltaic-powered intrusion detection devices in remote locations at Cape Canaveral Air Station in preparation for the Cassini mission to Saturn. Solar battery charging systems are also planned for an Area Status and Control System for Fuel Storage Area #1 at the Cape Canaveral Air Station. The photovoltaic panels will supply power for six

traffic barrier arm devices, six traffic stanchions, and wireless signaling and control components.

- MSFC is evaluating five potential renewable energy projects including photovoltaic parking lot lighting, ground source heat pumps, solar process water pre-heating, solar pre-heating of make-up air, and ambient light sensors.

Energy Showcases

The Marshall Space Flight Center Project Engineering Facility, Building 4203, was designated as NASA's showcase facility. The facility features many state-of-the-art energy efficiency and environmental quality measures, such as tinted windows, a variable air volume HVAC system, HCFC-123 chillers, an automated energy management system with direct digital controls, self-illuminating exit signs, and a radon venting system. The building is heated with steam from the Army's Redstone Arsenal steam distribution system, which is connected to the City of Huntsville's solid-waste-to-steam plant.

A NASA-funded comprehensive audit of the facility identified additional energy and water conservation measures, including lighting upgrades and occupancy sensors, high-efficiency motors, variable-frequency drives for the air handling units and chilled water pumping system, water-saving devices, and operations and maintenance recommendations. The water conservation measures, funded through the Federal Energy Efficiency Fund, should be completed by early FY 1998.

Training

In FY 1998, NASA energy managers attended numerous energy training courses offered by DOE FEMP as well as private organizations. The majority of NASA energy managers also attended the NASA Environmental Conference held in February 1998 in Cocoa Beach, Florida. The Conference featured several seminars on ESPCs, utility demand-side management programs, global climate change, and electric utility restructuring.

Funding

NASA-funded facilities energy conservation projects are divided into two categories. The first consists of minor capital improvement projects (under \$200,000) that can be achieved with Center funds. The second consists of major capital improvement projects (over \$200,000) requiring Construction of Facilities (CoF) program funding. Energy conservation projects must compete with all other construction projects for CoF

funding. Life-cycle costing is the primary tool for analyzing energy retrofit projects.

No CoF projects were implemented in FY 1998 for the sole purpose of energy or water conservation. However, many CoF projects do contain features that will conserve energy or water and reduce costs. Examples include HVAC system modernization, upgrade of energy monitoring and control systems, lighting and electrical system efficiency improvements, weatherization and other building envelope measures, and water conservation measures including conservation, recycling, and reuse projects.

It is not possible to accurately break out the cost of energy efficiency and water conservation measures from the overall budgeted amount for CoF discrete, repair, and rehabilitation and modification projects. The following estimate of FY 1998 and FY 1999 direct agency expenditures for energy efficiency and water conservation improvement projects and audits is based on data reported by the Centers and Component Facilities:

	FY 98	FY 99
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Direct Agency Expenditures	\$13,813K	\$13,695K
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Energy Savings Performance Contracts

NASA has some limited experience with ESPCs:

- Michoud Assembly Facility (MAF), a Government-owned, contractor-operated facility, implemented an energy cost reduction program with Lockheed-Martin Marietta Space Systems (LMMSS) in 1988. Under this program, LMMSS' prime contract with NASA was modified to include an energy conservation incentive clause. The program rewards LMMSS for exceptional performance in the management of energy usage at MAF by providing 8 to 14 percent of energy savings achieved as an additional award fee. The program also includes provisions for sharing savings achieved through energy conservation projects proposed by LMMSS. The share of savings is determined by whether NASA or LMMSS funds the capital investment. In FY 1995, the ECRP was modified to include cost savings for contractor recovery of utility company overcharges and negotiation of lower utility rates.
- GSFC has established a multiple award indefinite delivery, indefinite quantity (IDIQ) ESPC with two Washington, DC, area energy service com-

panies (ESCOs). The contract vehicles were awarded in May 1998, and each has a maximum value of \$5 million. They will provide for the installation of efficient lighting fixtures, LED exit signs, and other energy-saving technologies at GSFC and Wallops Flight Facility. GSFC is in the process of negotiating delivery orders for two lighting retrofits that will be issued in early FY 1999.

The following NASA Centers and Component Facilities are actively pursuing ESPC projects:

- Ames Research Center has been approached by a DOE Western region Super ESPC ESCO with a proposal to reduce energy and related operations and maintenance costs at the Center. If accepted, the proposal could result in \$2 million in energy efficiency improvements to lighting, HVAC, energy management and control systems, and domestic hot water heating systems.
- KSC is working with DOE to include a minimum purchase project in the Southeast region Super ESPC. The project will provide energy-efficient lighting and HVAC system modifications for eight buildings. An ESCO has been selected and is in the process of developing the delivery order Request for Proposal (RFP). Energy savings are projected at more than 16 BBtu and \$200,000 annually. KSC is also working with the Air Force 45th Space Wing to include NASA buildings in the scope of a new Air Force ESPC planned for Cape Canaveral Air Station.
- LeRC is working with DOE to include a minimum purchase project in the Midwest region Super ESPC. The project will include energy-efficient lighting and motors, steam distribution system improvements, and chilled water system modifications. LeRC is in the process of developing the RFP. Anticipated annual savings are \$82,000.
- JSC received contractor proposals for ESPC services through its BOSS contract. The proposals identified cost-effective energy and water conservation measures requiring investment of more than \$20 million, with annual savings in excess of \$2.5 million. JSC is working with DOE to implement the proposed ESPC projects through DOE's Central region Super ESPC contract.

Utility Partnerships

KSC issued a delivery order to Florida Power and Light (FPL) to finance and construct the LC-39 Emergency Generator Plant upgrade. The new plant will be used for emergency backup and peak shaving under FPL's Commercial/Industrial Load Control program. The project will be funded through electricity service rate savings, which are projected at \$770,000 annually. Also, a second study is under way to establish the feasibility of another utility incentive project with FPL to construct a thermal energy storage system at the Industrial Area Chiller Plant.

Dryden Flight Research Center is obtaining energy efficiency improvements for some buildings through the Edwards Air Force Base basic ordering agreement with Southern California Edison.

Lewis Research Center (LeRC) completed construction of a fueling station that is now operational. NASA invested \$105,000 for site preparation work. The East Ohio Gas Company provided the actual CNG fueling equipment. The project will potentially displace up to 77,000 gallons of gasoline annually.

NASA Centers received a total of \$793,500 in utility rebates during FY 1998. GSFC received \$611,800, Jet Propulsion Laboratory \$107,000, and KSC \$74,700. Several NASA Centers also received utility cost credits by voluntarily shedding electrical load or operating standby generation capacity when requested by their local utilities. GSFC received a \$24,815 credit from its electric utility for participating in one four-hour load curtailment event.

Environmental Activities

NASA Centers and Component Facilities are actively procuring energy-efficient goods and products that are life-cycle cost-effective. Procedures have also been adopted to procure ENERGY STAR® computers whenever possible. In the past year KSC purchased more than 3,300 ENERGY STAR® computers. KSC's Base Operations Contractor maintains a listing of 69 energy-efficient products that are available from the Center supply system.

JSC issued a Center Management Instruction, which mandates that all equipment purchased must follow procurement regulations outlined in Executive Order 12902, Section 507. JSC's BOSS contractor will institute mechanisms and set targets that will enhance energy-efficient procurement efforts.

Both GSFC and the contractor operator of the NASA facilities at Santa Susana Field Laboratory have individually joined the EPA Green Lights program. NASA is reviewing its position on establishing an ENERGY STAR® Buildings Program Partnership.

Most NASA Centers and Component Facilities include the successful implementation of energy management requirements in performance evaluations and positions descriptions for all those involved in energy management activities.

In FY 1998, NASA submitted four award nominations to the DOE Federal Energy and Water Management Awards program and received one award. KSC established the Energy Achievement Goals for Life and Environment (EAGLE) award program. During FY 1998, three employees received the EAGLE award. LaRC continued its Outstanding Energy Achievement Award program.

Lewis Research Center issued Operating Instructions entitled "Fluorescent Lighting Fixture Requirements" and "Occupancy Sensors" which requires the use of energy efficient lighting products when performing facilities work. These Instructions have also led to phasing out of older lighting products in the Center supply system with more energy efficient items.

Michoud Assembly Facility completed a major upgrade of desktop computers by purchasing 1,018 ENERGY STAR®-compliant personal computers. This computer upgrade allowed about 600 computers that were not ENERGY STAR®-compliant to be taken out of service.

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17. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

Energy Efficiency Performance and Implementation Strategies

The National Archives and Records Administration (NARA) owns and operates 12 separate facilities dedicated to the preservation, storage, display, and use of historical documents and artifacts. Because the stringent records storage requirements are very energy-intensive and preclude major changes in operational parameters to conserve energy, all of the NARA facilities are excluded from the energy reduction requirements of the National Energy Conservation Policy Act (NECPA).

NARA's energy consumption figures from 1995 to 1998 show a considerable reduction in consumption and are a reflection of the implementation of NARA's Energy Plan. Examples of measures taken to reduce the energy consumption during this time period are:

- Participation in electrical companies' load curtailment programs;
- Load-shedding policies at individual facilities;
- Lamp and ballast replacement projects;
- LED exit light retrofit projects;
- Installation of variable frequency drives on laboratory AHUs to allow reduced airflow and energy load during off hours;
- ATC modifications made to reduce energy consumption;
- Operational modifications made to reduce energy consumption;
- Installation of lighting controls; and
- Replacement of existing equipment with new high-efficiency equipment.

NARA's policy is to continue to maximize the operational efficiency of its buildings and minimize energy consumption. Items that are being planned for FY 1999 are:

- Continued implementation of energy conservation policies;
- Replacement of chillers at one of NARA's library facilities;
- Installation of new efficient doors and windows at one of NARA's library facilities; and
- Entering a joint energy purchasing agreement by one of NARA's library facilities with other Federal agencies in the area.

Energy Showcases

NARA is currently reviewing its facilities to determine if any qualify to be showcase facilities.

Energy Savings Performance Contracts

An energy audit and the negotiation of an ESPC was recently completed at one of the NARA facilities. The scoping and design of the work is in process.

Environmental Activities

NARA has an overall incentive award program that includes an award for exceptional performance in energy conservation.

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18. NUCLEAR REGULATORY COMMISSION (NRC)

Energy Efficiency Performance and Implementation Strategies

In FY 1998, the Nuclear Regulatory Commission's (NRC) One White Flint North (OWFN) building reported a 1.5 percent increase in energy consumption compared to FY 1989, the first full year the building was occupied. Two White Flint North (TWFN) reported a 1.0 percent decrease compared to FY 1995, the first full year the building was occupied.

NRC Buildings Energy Use and Costs, FY98

	BBtu	\$ (Thou.)
Electricity	85.0	1,823.0
Natural Gas	1.0	8.0
Total	86.0	1,831.0

NRC's Energy Management Plan is updated annually to identify strategies to meet the energy reduction goals of NECPA and Executive Order 12795. The energy management strategies implemented for both the OWFN and TWFN buildings in FY 1998 are:

- Utilization of an automated energy management system to maximize energy efficiency of HVAC equipment;
- Implementation of an employee awareness program that includes cutting off lights when not in use;
- Utilization of HVAC free cooling using heat exchanger technology;
- Reduced chiller operations;
- Energy-efficient design technologies in construction and new space;
- Quality Assurance inspections and Quality Control to identify wasteful and/or good operating practices;
- Enhanced water treatment and filtering to enhance energy-efficient equipment operations;
- Utilization of water management and conservation technology; and

- Implementation of commercial facilities management contract requirements to conserve energy by prudent equipment operating procedures and maintenance.

In addition, occupancy sensors were used in the OWFN building to control interior lighting. Also, the TWFN building utilized comprehensive preventive maintenance practices to promote energy efficiency.

Training

NRC is an active participant in the Interagency Energy Management Task Force. Members have attended seminars, workshops, and conferences sponsored by the Task Force.

Energy Savings Performance Contracts

During FY 1998, NRC's Energy Management Plan was updated to include an initial screening test prepared by DOE to determine if either the OWFN or the TWFN building were good candidates for an ESPC. The results of the test indicated that both are candidates and that significant energy savings would be achieved.

Utility Partnerships

During FY 1998, both buildings participated in the Potomac Electric Power Company's (PEPCO) voluntary load curtailment program. Also, PEPCO's Engineering Design Group performed a preliminary audit of buildings to identify potential energy conservation projects, such as installation of electronic ballasts, high-efficiency exit signs, and lighting controls.

Environmental Activities

The building operation and maintenance contract specifications were updated to ensure that all building support replacement projects and components are energy-efficient.

Implementation of energy conservation projects are included as elements in the position descriptions and performance plans of NRC facility managers.

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19. RAILROAD RETIREMENT BOARD (RRB)

Energy Efficiency Performance and Implementation Strategies

In FY 1998, the Railroad Retirement Board (RRB) reported a decrease of 7.6 percent in Btu per gross square foot compared to FY 1986, their first full year of reporting.

RRB Buildings Energy Use and Costs, FY98

	BBtu	\$ (Thou.)
Electricity	19.9	484.3
Natural Gas	19.5	86.1
Total	39.4	570.4

The headquarters building in Chicago, Illinois, is the only building over which the Railroad Retirement Board has operational control. RRB operates and maintains the building under a delegation of authority agreement with the General Services Administration (GSA).

RRB updated its energy conservation plan in March 1993 to incorporate the requirements of NECPA, Executive Order 12759, and EPACT.

RRB has invested in energy-efficient equipment and items such as T-8 lamps, electronic ballasts, compact fluorescent bulbs, light sensors, air controllers, etc., which have helped reduce energy consumption. Also, RRB operating procedures have been refined further to achieve the maximum energy savings.

Training

This agency does not meet the definition of an executive department under section 101 of Title 5 and therefore is not subject to the energy management training provision of the Energy Policy Act (EPAct). However, personnel responsible for energy management will receive the additional training that is to be provided by the GSA under the EPAct requirements.

Funding

RRB utilizes building operation funding for energy conservation measures. Between \$10,000 and \$20,000 per year of building operating funds are available for such measures. GSA, as the Government owner of the RRB building, has the responsibility to fund projects over \$50,000 and has future projects planned but not funded.

Energy Savings Performance Contracts

RRB has not entered into any ESPC contracts. The comparatively small size of potential contracts available to RRB—at a \$50,000 limit because of the delegation of authority agreement with GSA—is not practical for this type of procurement.

Utility Partnerships

RRB is developing partnership efforts with GSA Region 5. GSA intends to reduce Federal building energy costs by consolidating electrical usage and billing under a single contract. GSA advised it will issue a Request for Proposal on March 1, 1999, and award a contract effective October 1, 1999. Savings will come from combining agency loads and dealing with a single vendor.

Each agency will pay the contract price for electricity, which will be time-of-day and load-sensitive. GSA will provide assistance in purchasing the necessary meters. RRB has submitted its energy requirements to GSA for participation in this program.

Environmental Activities

New electric chillers installed by GSA utilize approved R-22 refrigerant. All obsolete fluorescent ballasts have been and will continue to be disposed of safely. Older CFC drinking fountains are being replaced with new energy-efficient, non-CFC refrigerant fountains.

RRB has developed procedures to ensure procurement of energy-efficient products whenever cost-effective.

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20. SOCIAL SECURITY ADMINISTRATION (SSA)

Energy Efficiency Performance and Implementation Strategies

SSA Buildings Energy Use and Costs, FY98

	BBtu	\$ (Thou.)
Electricity	591.7	11,625.0
Fuel Oil	8.9	26.5
Natural Gas	120.5	673.2
Purchased Steam	32.0	389.0
Total	753.1	12,713.7

To accomplish the requirements of EPC Act and Executive Order 12902, SSA recently conducted comprehensive energy audits of its entire inventory of Federally-owned delegated space. Prior to FY 1998, SSA had audited only portions of this space. In FY 1998, the audit program was expanded; the following is a list of audits and energy projects initiated during FY 1998:

Audits:

- Northeast Program Service Center, New York, New York;
- Mid-Atlantic Program Service Center, Philadelphia, Pennsylvania;
- Wilkes-Barre Data Operations Center, Wilkes-Barre, Pennsylvania;
- Woodlawn Headquarters Complex, Woodlawn, Maryland;
- Western Program Service Center (WNSPC), Richmond, California; and
- Great Lakes Program Service Center, Chicago, Illinois.

The audits covered 90 percent of SSA's delegated space; the remaining 10 percent is leased.

Projects:

- Energy-efficient lighting and lighting controls, Supply Building, Woodlawn, Maryland; and
- Energy-efficient lighting, Operations Building, Woodlawn, Maryland.

These two lighting projects have a combined worth of \$2.3 million.

At the WNSPC SSA has initiated a project to use water from an underground stream for irrigation, gray water for flushing water closets, and make up water for cooling towers.

A 1996 audit identified \$700,000 in energy conservation projects for the National Computer Center (NCC). A new central heating/cooling plant is being installed through a design/build process. This new plant should provide \$73,000 in annual demand savings and the energy projects should save \$271,000, and more than 4.6 million kilowatt-hours, per year. Design began in June 1998 and construction was underway in the fall of 1997. Work is to be complete in January 1999.

When the energy projects initiated during FY 1998 are completed, SSA should save more than 11.6 million kilowatt-hours of electricity annually. This will avoid the production and emission of more than 24.8 million pounds of carbon dioxide, more than 100,000 pounds of sulfur dioxide, and 74,750 pounds of nitrogen oxides.

Solar lighting was installed at the NCC as a demonstration project. Day lighting was explored at several warehouses but was not economically feasible when compared to energy-efficient lighting technologies. However, daylighting is being incorporated into prospectus level renovations. SSA is also looking into using solar preheating of outdoor ventilation air and ground source heat pumps.

Energy Showcases

GSA has submitted, on behalf of SSA, a prospectus request to build a new standalone childcare facility at SSA Headquarters in Woodlawn, Maryland. SSA plans on designating this as a showcase to include solar preheat of fresh air, ground source heat pumps, passive solar design, and natural day lighting.

Training

Building managers and staff have attended a variety of training classes and conferences examining life-cycle cost analysis, alternative fuels, lighting, controls, and demand side management practices. SSA staff attends GSA regional conferences.

Also in FY 1998, SSA staff participated in a DOE interactive training program with the aim of having a trained energy manager in each SSA delegated facility. SSA has scheduled additional training designed to help energy managers track energy usage and cost. All personnel responsible for tracking energy have been trained or will be trained by the end of FY 1999 in energy conservation.

Funding

In conjunction with GSA, SSA has completed or expects to complete in excess of \$67 million in renovations to its delegated buildings between FY 1997 and FY 2000. The vast majority of these renovations are GSA-funded prospectus level projects.

SSA has invested \$2.3 million of its own funds in energy-efficient lighting conversions during FY 1998. These renovations should yield \$800,000 in annual energy and maintenance savings.

Energy Savings Performance Contracts

SSA has not initiated any energy savings performance contracts (ESPCs) because many of the ideal candidate projects (primarily lighting) have either been accomplished or will be through prospectus work.

Utility Partnerships

GSA's areawide utility contracts include all SSA's delegated buildings, and SSA is designated as an ordering official on these contracts. SSA has used them to perform energy audits (\$426,000) and lighting projects (\$2.3 million).

Environmental Activities

SSA has reduced its stock of CFC equipment dramatically. In 1998, chillers at the NCC were removed and CFC-free equipment was installed. At the conclusion of this contract, 8 out of SSA's 13 central plants will be CFC compliant. One of the remaining three should be converted during FY 2000.

It is SSA's routine practice to recycle both lamps and ballasts. This requirement has been incorporated into SSA contracts.

SSA awards employees whose job descriptions require energy management skills and whose overall performance or individual acts are exceptional. SSA also recognizes individual contributions to energy savings through on-the-spot and suggestion awards programs.

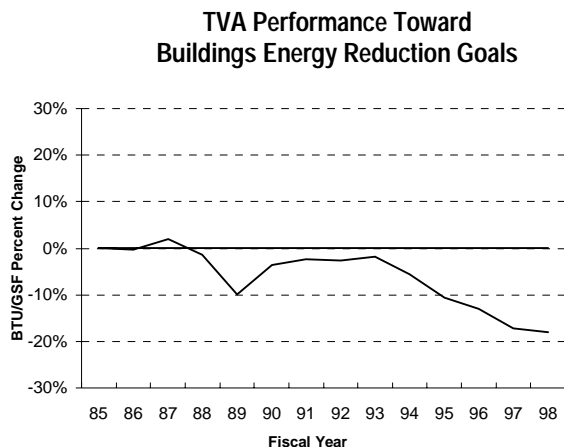
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21. TENNESSEE VALLEY AUTHORITY (TVA)

Energy Efficiency Performance and Implementation Strategies

During FY 1998, the Tennessee Valley Authority reported a 18 percent decrease in energy consumption in Btu per gross square foot compared to FY 1985.



TVA Buildings Energy Use and Costs, FY98

	BBtu	\$ (Thou.)
Electricity	650.8	8,488.1
Fuel Oil	3.0	20.4
Natural Gas	4.6	43.9
Total	658.4	8,552.4

TVA's Energy Plan ensures the efficient use of energy in the operation, maintenance, and design of TVA buildings and facilities. During FY 1998, TVA implemented energy conservation opportunities (ECOs) costing \$1.46 million with a potential annual savings of more than \$740,000. This is an average payback of 1.96 years.

To meet the challenge of surveying more buildings, the DOE Facility Energy Decision System (FEDS) building energy analysis program is being used to identify and evaluate potential ECOs. Cost effective ECOs are identified through the FEDS software, allowing manpower to be used more effectively and efficiently for implementation of measures.

The following are sample retrofits performed on buildings during FY 1998:

- SWAP II, a pilot program designed to upgrade lighting and lighting controls was started. Potential savings from the implementation of SWAP II through operation and maintenance activities is more than \$1 million, with average payback of one year;
- Two chillers were replaced at the Chattanooga Office Complex (COC), with an estimated annual energy savings of more than \$65,000;
- Restroom lighting was retrofitted at the COC, saving an estimated \$160 per year;
- A motor was replaced on a COC air handler with an estimated annual savings of more than \$295;
- A variable frequency drive unit was installed, saving approximately \$440 annually;
- Photocell lighting controls were installed on 400 watt high pressure sodium lights, saving more than \$1200 per year; and
- Energy management and control systems (EMCS) were installed at the Columbia Customer Service Center (CSC), Murfreesboro CSC, and Bowling Green CSC. Annual savings from these installations are expected to exceed \$7,000. TVA now has EMCS installed in 23 buildings.

During FY 1998, TVA also completed:

- Ninety-six fossil energy reduction projects at its Allen, Bull Run, Colbert, Cumberland, Gallatin, Johnsonville, John Sevier, Kingston, Paradise, Shawnee, and Widows Creek plants; and
- Nuclear energy reduction and environmental conservation projects at its Browns Ferry, Sequoyah, Watts Bar, and Bellefonte plants.

Energy Showcases

No new showcases were designated during FY 1998. The 738,500 gross square feet Knoxville Office Complex in Knoxville, Tennessee, is TVA's existing showcase.

Training

TVA provides training for employees in order to accomplish objectives for the Internal Energy Management Program (IEMP). TVA provides updates on current Federal requirements and regulations for employees, managers, and TVA customers, when requested. Ongoing energy management training is provided to managers of facilities. Building energy monitors are appointed and trained for all primary corporate buildings. TVA also educates staff in both energy and environmental related topics through the TVA University.

Funding

TVA is establishing funding procedures for energy management projects under the IEMP and through the Agency Energy Management Committee. Buildings projects are primarily funded through renovation and modernization efforts. General operations projects are ranked for economic benefit compared to other TVA projects to determine funding availability and implementation status and are funded mainly through the capital budgeting process.

Energy Savings Performance Contracts

TVA considers the use of energy savings performance contracts when cost effective for TVA and its customers. During FY 1998, TVA did not enter into any energy savings performance contracts.

Utility Partnerships

TVA supports energy-saving demand-side activities when cost effective and in the best interest of its customers. TVA is currently investigating the potential for partnerships with its customers for development of demand-side programs and activities. Strategies recommended in TVA's Integrated Resource Plan (IRP) would increase TVA's activity in the implementation of demand-side management programs.

Vehicles

At the close of FY 1998, TVA was operating a sedan fleet consisting of 297 compact, 80 mid-size, and 75 full-size sedans.

In FY 1998, TVA did not purchase any alternative fueled vehicles (AFVs). TVA's AFV fleet currently consists of 15 electric vehicles (EVs), with plans to add 5 more during FY 1999.

Environmental Activities

TVA's affirmative procurement policy includes a statement that energy management and efficiency will be considered along with environmental impacts when new or replacement energy-consuming equipment is purchased.

In keeping with its goal of environmental responsibility, TVA became the first Federal agency to join the EPA/DOE Green Lights Program and is in the process of becoming a partner in the EPA/DOE ENERGY STAR® Building program. TVA is also involved in solid waste minimization, sustainable architecture, by-products with recycle content, reduction of green house gas programs, and other applications of environmental stewardship in conduct of its business.

In FY 1998, TVA became a partner in the Environmental Protection Agency's ENERGY STAR® Building program. TVA also joined the Motor Master Program established by DOE.

TVA's Resource Group undertook many water and land management activities during FY 1998 to help reduce energy consumption and environmental impacts.

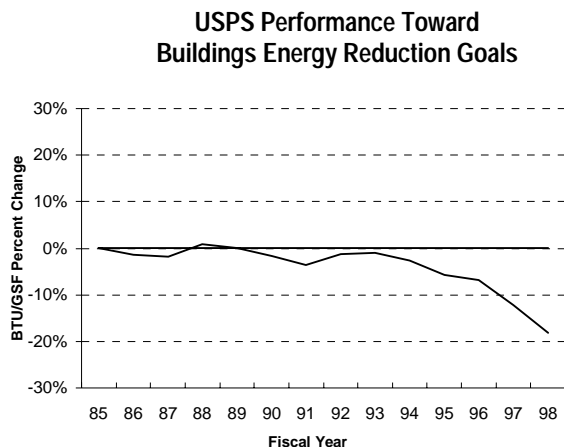
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22. UNITED STATES POSTAL SERVICE (USPS)

Energy Efficiency Performance and Implementation Strategies

In FY 1998, energy use in U.S. Postal Service facilities decreased by 18.1 percent in Btu per gross square foot compared to FY 1985.



USPS Buildings Energy Use and Costs, FY98

	BBtu	\$ (Thou.)
Electricity	13,903.9	300,734.5
Fuel Oil	646.8	4,158.4
Natural Gas	7,640.5	40,833.6
Other	492.7	4,855.3
Total	22,683.9	350,581.8

The Postal Service's energy consumption index (ECI) decreased in FY 1998 from FY 1997. This decrease is due to three factors:

- Continuing replacement of old facilities with more energy-efficient facilities;
- The development of a comprehensive information system that can track energy costs more accurately; and
- A continuing effort to identify and update facility energy consumption data.

Because Postal Service facilities are energy-efficient because of past conservation efforts, continued efforts to further improve efficiency, at a time when energy prices at a historic all-time low, prove to be difficult. Moreover, the Postal Service has added more than

10,000 automated and mechanized equipment systems, significantly increasing Postal Service use of process energy.

The Postal Service's strategy to attain the energy consumption reduction goals are:

- Capital investment of energy conservation equipment;
- Affirmative purchasing of energy conservation products and services;
- Education and awareness of employees;
- Continued execution of energy savings performance contracts (ESPCs);
- Participation in demand-side management programs;
- Design and construction of energy-efficient buildings;
- Improved operation and maintenance procedures;
- Capital investments for energy retrofit projects;
- Procurement of energy-efficient equipment; and
- Installation of automatic controls.

The pace of completing additional comprehensive facilities audits will be determined on the basis of the Postal Service's capability to implement subsequent energy conservation projects. The Postal Service plans to focus its audit priorities on processing and distribution facilities and customer service facilities more than 10,000 square feet in size.

In FY 1998, more than 3,200 building surveys were conducted to establish priorities for energy conservation projects and additional comprehensive and detailed energy audits for identifying further energy savings opportunities.

In FY 1998, the Postal Service purchased and installed more than 30,000 light emitting diode (LED) exit signs. The total procurement cost is \$750,000, and the estimated savings are \$2 million over the total life cycle.

The Postal Service is working with Granger, Inc., to develop a catalog of energy-efficient products and supplies for use by facility managers. Granger also agreed to perform motor surveys and provide replacement motor recommendations with a high energy efficiency rating.

During FY 1998, the Postal Service developed the USPS *Green Building Design Guide*, which provides design standards for energy-efficient systems. The guide also includes initiatives that incorporate environmental consideration in the design and construction of new facilities.

Application of renewable energy as an alternative fuel source is investigated as a part of energy surveys. In addition, the evaluation of renewable energy for securing dual-fuel capability is encouraged during the design process for new facilities. Several facilities have installed solar lighting in Hawaii and Southern California.

The USPS has entered a partnership with DOE in supporting further development and commercial application of solar and other renewable energy sources. The USPS will participate in DOE's effort by jointly developing projects and provide pilot cases where these projects and concepts could be tested.

Energy Showcases

The Postal Service has designated three buildings as "Showcase for Energy" facilities. These are located in Portland, Oregon; St. Paul, Minnesota; and Ft. Lauderdale, Florida. Energy audits have been completed at the three facilities, and various retrofit projects are scheduled for completion. These projects include:

- Installing T-8 lights with electronic ballasts;
- Upgrading central HVAC systems; and
- Installing better energy management controls.

The Postal Service is working with DOE, local utility companies, and other contractors to make these facilities examples of energy conservation and efficiency efforts.

Training

During FY 1998, the Postal Service developed a series of training seminars on Shared Energy Savings contracts, energy program management, and utilities

procurement strategy. These training classes are attended by newly appointed energy managers and procurement officials responsible for buying utilities and awarding energy retrofit projects. The Postal Service will continue to provide additional training in energy as the need is identified.

Training materials have also been developed to emphasize the role and responsibility of contracting officers in complying with energy and environmental regulations.

Funding

Energy projects within the Postal Service are prioritized using criteria such as operational needs, safety and health issues, and environmental benefits, in addition to energy savings. Economic benefits are measured by net present value and return on investment to the Postal Service. Funds for implementation of energy retrofit projects may be provided by the local and area office budgets or by Headquarters.

In 1998, the Postal Service centrally funded \$16 million for the purpose of improving the energy efficiency of its facilities. Headquarters and Area funds for energy retrofits are made available for projects that are prioritized based on return on investment. Projects are ranked primarily based on this and are funded until budgeted funds are depleted.

The Postal Service developed a 20-year program to replace CFC-based chillers. The Postal Service allocated \$15 million in FY 1998, and the funding priority is based on the energy efficiency gains, age of equipment, and scheduling of companion projects.

Energy Savings Performance Contracts

The Postal Service manages Shared Energy Savings (SES) contracts, equivalent to ESPCs. Since the first SES contract in 1987, the Postal Service has made significant progress in overcoming skepticism of the SES concept. Now, the Postal Service has 33 SESs in place for 1,157 facilities; the total estimated investment value is more than \$79 million; and the expected total energy savings are \$7 million per year.

In 1998, the Postal Service implemented eight additional SES projects, covering 455 facilities in:

- Louisville, Kentucky (5 facilities);
- Eastern Shore, Maryland (111);

- Baltimore, Maryland (41);
- Dallas, Texas (8);
- Oklahoma City, Oklahoma (1);
- Tampa, Florida (260);
- Atlanta, Georgia (2); and
- Birmingham, Alabama (27).

Total investment was more than \$43 million, and the annual savings will amount to nearly \$2 million.

Environmental Activities

A quarterly newspaper for purchasing personnel covers specific energy and environmental issues. Development of energy-specific guidance for inclusion in the Postal Service Procurement Manual is ongoing.

Energy user awareness and recognition programs include several articles presented on energy efficiency initiatives on the USPS electronic postal link system. Facility and individual energy efficiency improvement awards were also presented to USPS employees.

The Postal Service participated in the "You Have the Power" campaign, distributing more than 10,000 posters throughout 36,000 postal facilities. Seven Postal Service energy champions are featured among these posters.

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